Chemical Week

September 27, 1952 Price 35 cents

How "real" and six-month-stint "shadow" directors team up to manage firm, train employees . p. 18

CW Report: Barrett's Sayre, NYU's Marsel size up waxes—now $100 million saleswise . . . . . p. 29

Commercial testers gloat, research institutes grumble as new law topples tax exemptions . . . p. 52

Overseas buyers bewail our "off-again, on-again gone-again" chemical export habits . . . p. 65

Here's today's sulfur outlook: early catch-up and keep-up—but it'll cost more . . . . . p. 77

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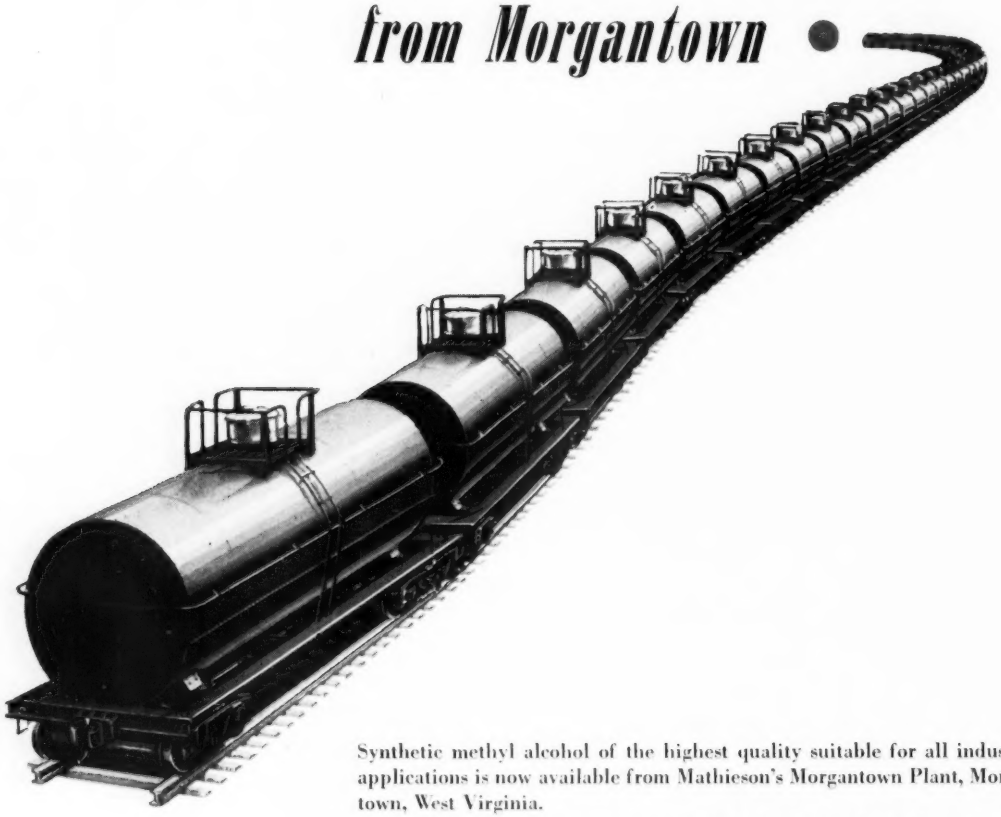
from Morgantown



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SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

Chemical Week

Volume 71 Number 13

September 27, 1952

OPINION	2
NEWSLETTER	9
BUSINESS & INDUSTRY	13
CW REPORT	29
RESEARCH	52
PRODUCTION	58
DISTRIBUTION	65
MARKETS	73
SPECIALTIES	83
BOOKLETS	88

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IOWA DEVELOPMENT COMMISSION

OPINION . . .

Can't Have and Eat

To THE PUBLISHER: My congratulations on your [company] editorial (Aug. 23) "Aid or Trade, A Crisis Ahead."

It should help make the American manufacturer understand that he cannot have his cake and eat it too.

HYMAN I. MALATZKY
Himala International
New York, N. Y.

Scout and Singer

To THE EDITOR: . . . If Scoutmaster Floyd Philgreen . . . [pictured in CW's photo story (Aug. 9) on Texaco's community relations accomplishments at Beacon, N. Y.] . . . is the same fellow I knew in Shawnee, Kansas, he:

1) Has gained several pounds
2) Will be a member of the choral group
3) Will also be working with Rev. Stearns at the Fishkill M. E. Church.

Is he?

THOMAS R. DUNN
Aqua-Therm, Inc.
Dayton, Ohio

Scoutmaster Philgreen is indeed ex-Shawnee, Reader Dunn, and admits to: (1) gaining 26 lbs.; (2) subordinating choir activities to scout work and Sunday School teaching.—ED.

Noses Still Needed

To THE EDITOR: . . . I appreciate your mention of the Barail Osmometer (Aug. 30) . . . which you say [correctly] "permits a trained technician to measure upwards of 300 intensities of odor."

However, the statement that "It's agreed that the instrument hasn't been developed to rival the nose" may be a little ambiguous. It doesn't "rival the nose" . . . merely helps its function.

In the same manner as the microscope permits the eye to see and measure microns, cells, fibers . . . and other things invisible to the naked eye . . . the Osmometer enables the nose to measure the intensity of odors . . . which the human nose cannot do alone.

As readers of CW, which is so popular among research executives, could get the impression that it does

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: W. A. Jordan, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

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OPINION . . . . . .

measure odors without using the nose, I hope you will clear away any possibility of misunderstanding. . . .

LOUIS C. BARAIL
Consulting Biochemist
New York, N. Y.

Chemist's Poetic Brew

TO THE EDITOR: We read with great interest your editorial (*Aug. 16*) in which you expressed your opinion of chlorophyll.

It is the writer's opinion that there are many aspects of the chlorophyll situation that are not understood generally, that chlorophyll in the natural state is oil-soluble. Thus in our process we produce various types of chlorophyll for various applications, and particularly we produce water-soluble chlorophyll which is used mainly in the deodorants, etc. . . .

You have our permission to quote the enclosed if you so desire.

C. P. YOUNG
President
American Chlorophyll Division
Strong Cobb & Co., Inc.
Lake Worth, Fla.

Thank you, Reader Young, not only for your letter, but also for your enclosure, which we hereby add to our poetry anthology.—ED.

*Chlorophyll**
(with apologies to Nobel Prize winners Willstatter and Fischer†)
"Why reeks the goat on yonder hill
Which feels all day on *Chlorophyll?*"
I'll tell you friends 'tis very true
He doesn't eat the *chemist's* brew!

MEETINGS . .

Tech. Assn. of Pulp and Paper Ind., New England Section, Berkshire Inn, Great Barrington, Mass., Oct. 10-11.

Tech. Assn. of Pulp and Paper Ind., Engineering Conference, Morrison Hotel, Chicago, Ill., Oct. 13-16.

Society of Plastics Engineers, Cleveland-Akron Section and Akron Rubber group, Mayflower Hotel, Akron, O., Oct. 17.

National Safety Council, 40th national exposition, Chicago, Ill., Oct. 20-24.

Amer. Oil Chemists' Society, 26th annual fall meeting, Netherlands Plaza Hotel, Chicago, Ill., Oct. 20-22.

Assn. of Consulting Chemists and Chemical Engineers, annual open door dinner meeting, Hotel Belmont Plaza, New York, N.Y., Oct. 28.

* Copyright American Chlorophyll Div., Strong Cobb & Co., Inc.

† Willstatter and Fischer were awarded the Nobel Prizes in chemistry for their work on chlorophyll in 1915 and 1930 respectively.

Development News

CAN YOU PROFIT BY THE UNIQUE PROPERTIES OF PLURONICS?

Because the Pluronics* are new and different, their evaluation is of interest in practically all applications where surface active agents are used, or where a surfactant would be used if a suitable material were available. Some of the applications collected to date on the Pluronics are presented here. For some applications, because of the newness of the products, the information is of necessity rather sketchy. This information on applications, therefore, is presented not as specific recommendations but as a guide to help you develop uses—perhaps new and different from any listed here—for the Pluronics in your operations. Our research and development groups are daily increasing our knowledge of the Pluronics. If there is any specific information we can supply, please let us know.

PLURONICS PROPERTIES

MOLECULAR WEIGHT—Most surface active agents have molecular weights in the range of 300-600. In the Pluronics series, the lowest molecular weight material is Pluronic L62 with a value of about 2000. Pluronic F68 has a molecular weight over 7500, and is the largest molecule in the Pluronics series.

TOXICITY—Pluronic F68 has an unusually low order of acute oral toxicity. Pluronics L44, L62 and L64 are considerably less toxic than most surfactants.

PHYSICAL FORM—Pluronic F68 is the only 100% active agent nonionic detergent offered in flake form. The liquid Pluronics are light in color compared with an amber color for most competitive nonionics.

FOAMING—As measured by the Ross-Miles Foam Test, Pluronic L62 generates less foam than any other nonionic or anionic surfactant we have tested.

TASTE AND ODOR—Pluronic F68 is unique among nonionics in being practically tasteless and odorless.

HYGROSCOPICITY—Pluronic F68 is much less hygroscopic than any other flake surfactant we have tested.

SOLUBILITY—The Pluronics series permit the selection of a product of almost any given solubility. Pluronic L62 is slightly soluble in water at room temperature while Pluronic F68 is very soluble. Although the Pluronics have the reverse solubility properties characteristic of nonionics, Pluronic F68 is so soluble that it shows no cloud point in distilled water, even at the boiling point.

COMPOSITION

The Pluronics are a series of nonionic surfactants, prepared by condensing ethylene oxide with a hydrophobic base formed by the condensation of propylene oxide with propylene glycol. This series may be represented empirically by:

$$HO(C_2H_4O)_a(C_3H_6O)_b(C_2H_4O)_cH$$

TOXICITY

Pluronic F68

Acute Oral

The administration of Pluronic F68 orally to the rat, rabbit or dog in doses of 15, 10, 5 or 2 Gm. per kilogram of body weight, did not produce acutely toxic effects. Diarrhea was the only gross symptom observed in certain of these animals at the higher dose levels. The LD_{50} for Pluronic F68 orally in mice is greater than 15 Gm. per kilogram of body weight. Preliminary experiments have indicated that the oral administration of Pluronic F68 to rats and dogs did not significantly alter the blood elements as revealed by an examination of the blood sugar or urea nitrogen levels and the hemoglobin and red and white cell counts. A microscopic histologic examination of the viscera of rats from 24 to 96 hours after large oral doses of Pluronic F68 failed to reveal any evidence of pathologic changes attributable to the material administered.

Chronic Oral

Dogs fed daily doses of 0.1 and 0.05 Gm. per kg of body weight for six months showed no symptoms of toxicity. Rats were fed a diet containing 3% and 5% of F68 daily for six months. The average body weight gain was about the same as that of the control group.

Intravenous

Rabbits and dogs tolerate asymptomatically intravenous doses of Pluronic F68 of 0.1 and 0.05 Gm. per kilogram of body weight.

Eye, Skin, Gum Sensitivity

10% Pluronic F68 solutions caused no irritation when applied to the gum or eye of rabbits or the skin of dogs, guinea pigs, rabbits or man.

Pluronics L44, L62, L64

Acute Oral

Pluronics L44, L62 and L64 have approximately the same acute oral toxicity for the rat. These materials are relatively non-poisonous when administered orally to the rat with an LD_{50} of approximately 0.5cc per 100 Gm. of body weight. When administered in lethal doses those materials produce depression, prostration and appear to produce death via respiratory paralysis.

Eye Sensitivity

Pluronics L44, L62 and L64, at any concentration, were found to cause no permanent damage when applied to the eye of rabbits. Irritation at common use concentrations was found to be negligible.

A copy of a bulletin presenting more complete toxicological and irritation data on the Pluronics is available upon request.

APPLICATIONS

It should be noted that the uses of the products herein stated are given by way of illustration and suggestion. No representation or warranty of freedom of legal liability, including patent liability, incident to the use of said products, is herewith made by Wyandotte Chemicals Corporation.

AGRICULTURAL CHEMICALS

The Pluronics are very useful as emulsifiers and dispersing agents to make emulsifiable oil concentrates and wettable powders, and to improve the wetting properties of a wide variety of insecticides, fungicides, herbicides and other agricultural chemicals.

Pluronic L62 is particularly good because of its excellent emulsifying characteristics for DDT and its low foaming properties. The following typical formulation may be used as a base for modification:

DDT	25%
Pluronic L62	3-5%
Deodorized Kerosene	7-10%
Aromatic Solvent	60-65%

Pluronics are useful to replace all or part of the anionic surface active agent in wettable powders, especially where hard water conditions are encountered. Pluronic L62 is often preferred because of its low foaming properties. A recommended concentration is 3 to 6% of Pluronic L62.

Pluronics are excellent wetting agents for use in wettable sulfur formulations. They also serve to lay the dust of Parathion in certain formulations.

AUTOMOTIVE PRODUCTS

Pluronic F68 is a very suitable product as a non-foaming wetting agent for use in radiator cleaners. It is suggested that the Pluronic F68 be dusted with a few percent of very finely ground sodium sulphate or other similar material and then mixed with oxalic acid, sodium bisulfate or both.

The Pluronics are useful as additives to car wash formulations. The liquid Pluronics promote free rinsing and the absence of streaking. However, since their foaming power is rather low, the addition of a few percent alkylarylsulfonate to generate foam is recommended to meet consumer acceptance.

Pluronic L62 shows some promise as an additive to brake fluid formulations. Pluronic L62 is compatible with the materials generally used and possesses the proper properties with regard to rubber swelling and viscosity.

COSMETIC APPLICATIONS

Toothpaste

Pluronic F68 permits the formulation of new and different types of toothpaste. It is the only nonionic offered commercially that is practically tasteless. Being nonionic permits its use with quaternary ammonium compounds and other materials which would be affected by the anionic surfactants currently used in toothpaste.

Pluronic F68 may also be used in standard toothpastes as a replacement for all or part of the present surfactants to improve the taste of the product.

Hair Preparations

Pluronic F68 has found a market in hair preparations because of its relative absence of eye irritation, good cleaning action even in hard water, and absence of excessive defatting of the skin. Pluronic F68 is said to be especially effective in shampoos for dyed hair. Pluronic F68 imparts a desirable sheen to the hair and makes the hair much easier to control immediately after washing.

Pluronic F68 has also found application in other cosmetics such as hair tonics, special hair preparations, sun-tan lotions, stick deodorants, perfumes and shampoo bars for animals.

DUST-LAYING

The Pluronics are effective dust-laying agents in products such as cleansers, powdered bleaches and insecticide formulations. Pluronic F68 is particularly satisfactory in those applications where the temporary dust-laying effect of liquid nonionics is not satisfactory. The Pluronic F68 may be incorporated in molten form, and since it cools to an immobile solid, does not lose its effectiveness by migration as liquid nonionics do.

EMULSIFIERS

The Pluronics show considerable promise as emulsifiers for many high molecular weight materials such as insecticides, silicones and various waxes. They are particularly effective for oil-in-water type emulsions.

(continued on next page)

Development News

(Pluronics continued)

The Pluronics are also suitable as emulsifying agents where acids may be generated in the emulsion. Due to their nonionic nature and inherent stability, they are unaffected by acid formation.

FORMULATED DETERGENTS

Home Laundry

The Pluronics are outstanding as the active agent material around which to formulate products for home laundry use. Although in most cases any of the Pluronics may be used, additional advantages may be obtained by selecting the proper Pluronic to contribute the desired properties to the formulation. Where maximum cleaning efficiency is the major consideration, Pluronic L64 and Pluronic L44 are most effective.

Where cleaning efficiency must be accompanied by low-foaming properties, as in formulations for use in cylinder-type automatic washers, Pluronic L62 is outstanding. In those formulations where a completely dry, nontacky product is required, or where the available mixing facilities are not satisfactory to incorporate evenly liquid nonionics with the dry builders, Pluronic F68 is recommended.

Careful laboratory and field work have shown that a combination of nonionic and alkylarylsulfonate surfactants has greater cleaning efficiency under most conditions than either type alone. For some cleaning formulations, a combination of the Pluronics and Kreelon* 4D is recommended. The addition of Kreelon also greatly increases the foaming properties of the formulated product, which is desirable in products to be used in standard home washing machines. Where low foaming is preferred, the proportion of Kreelon may be reduced. Suggested formulations are available on request.

NOTE: Kreelon 4D is the trade name for Wyandotte's 40% active agent alkylarylsulfonate.

Commercial Laundry

The Pluronics find several uses in commercial laundry applications. Pluronic L64 may be used to extent of 15-20% with the usual alkaline builders and promoters to make a very efficient commercial laundry compound. If desired, Pluronic L64 or Pluronic F68 may be used in conjunction with soap with excellent results. The proportion of Pluronic used in such formulations may vary from 2-10%.

Dairy Cleaners

General purpose dairy cleaners may consist of a blend of soda ash, sodium metasilicate, and sodium polyphosphate. The Pluronics, particularly Pluronic F68, are highly effective additives to this type of formulation. The recommended proportion of the Pluronics varies from the minimum of 2% up to approximately 10% of the composition.

The Pluronics are satisfactory for incorporating in the strongly-acid products designed to remove milkstone, as they retain their effectiveness for cleaning and wetting in the presence of acids.

Detergent-Sanitizers

In compositions of this type where the purpose is to sanitize as well as clean in one operation, the use of the Pluronics offers several outstanding advantages, including compatibility with the cationic, good cleaning efficiency and low foaming. The proportion of the sanitizer, usually a cationic quaternary, in the formulation is that required to give 100-200 parts per million in solution at the recommended use concentration. The proportion of Pluronic should be 3-7 times that of the quaternary.

For use in liquid detergent-sanitizers, Pluronic L64 appears to be best. In those cases where a solid product is desired, Pluronic F68 appears to be the most satisfactory agent commercially available. Flake anionic materials cannot be used because of their interaction with the quaternary.

Location Rug Cleaning

Pluronic F68, combined with an anionic detergent of the alkylarylsulfonate type, is a very efficient cleaner for the washing of rugs without removing them from the floor. The Pluronics may be used with or without additional materials in a solution concentration of 0.5-2%. The Pluronic F68 dries to a powder and is easily removed by vacuuming, sharply reducing the rate of resoiling of the rug. Although Pluronic F68 is itself an outstanding cleaning material for rugs, alkylarylsulfonates may be used with it in this product to increase the total foam which acts as a lubricant for the rug cleaning machine.

Mechanical Dishwashing

The usual mechanical dishwashing formulations consist of mixtures of sodium metasilicate and a complex phosphate with or without soda ash and other materials to impart special properties. The addition of 0.5-1% Pluronic L62 improves these formulations by facilitating rinsing and aiding in drainage of rinse water, and by helping to eliminate water marks. Pluronic L62 is superior to other surfactants for this application because of its extraordinarily low foaming properties.

The Pluronics have also proved to be very satisfactory for cleaning glassware, both laboratory glassware and commercial products such as thermometer tubes.

Scouring Powder

A very popular foaming type scouring powder can be prepared by the use of 70-80% of a suitable abrasive, approximately 5-15% modified soda, a small (1-2) percent of sodium polyphosphate and approximately 4%, on an active agent basis, of a surface active material. Pluronic F68, either alone or in combination with alkylarylsulfonate, is very well suited for use in this application. If the Pluronic F68 is added in a molten state, it acts not only as an efficient detergent but also serves to lay the dust. Being relatively nonhygroscopic, the Pluronics may be used to replace part of the alkylarylsulfonate commonly used.

Miscellaneous

For the reasons given in the introduction, the Pluronics also find applications in many other formulated detergents designed for specific uses, as for example in bakery pan cleaners, in detergent bars for decontamination of radioactivity, in floor etches, laundry bleaches, and tile floor cleaners.

LATEX APPLICATIONS

All of the Pluronics apparently are satisfactory stabilizers for latex emulsions, with Pluronic L62 somewhat superior to the others for protecting the latex against freezing. A useful concentration of the Pluronics is 1.0-2.5%, based on the weight of the emulsified phase.

Pluronic F68 may also be suitable as a dispersing agent for the carbon black used in the compounding of rubber. For this use, 1-2 parts of Pluronic F68 and 20 parts of carbon are made into a slurry, and 50 parts of this slurry are then used with each 100 parts of rubber.

Pluronic F68 is also said to contribute a softening or plasticizing action to vulcanized latex film.

LEATHER

The Pluronics, particularly Pluronic F68, show promise in the wetting back of tanned leather. In addition to increasing the rate of penetration into the leather, the Pluronics contribute a softer feel.

The Pluronics may also be suitable for fat liquoring when combined in a proportion of up to 10% with the sulfonated oils usually used for this purpose.

LITHOGRAPHY

A combination of Pluronic L62, Pluronic L44 and Carbose* I has been found to be very effective for cleaning lithographic plates and mats. An outstanding feature of this combination is that it is practically non-foaming. Pluronic L62 may be used in strong acid plate-etching baths, in a concentration of 0.02-0.05%, for increased wetting action. The absence of foam in this application is particularly desirable.

METAL CLEANING

Because of the property of reverse solubility and because of the relative ease with which they are salted out of solution, nonionics are not as widely used in metal cleaning operations as their other properties would justify. Pluronic F68 largely overcomes this disadvantage by having no cloud point. The cloud point of the liquid Pluronics can be raised to a satisfactory temperature by the addition of alkylarylsulfonates, the proportion to be used depending on temperature and other materials used in the formulation.

The Pluronics, particularly Pluronics L62 and L44, appear promising as wetting agents for sulfuric acid pickling of steel. Concentrations of 0.05-0.10% are suggested as a starting point for investigation.

The Pluronics appear to be compatible and do a good job in aluminum anodizing. Cationics are unsatisfactory for this application as they precipitate the dye-stuff used while the anionics, which are compatible, reduce the rate of dyeing by as much as 25%.

Pluronics also show some promise in alkaline metal cleaners and for cleaning oil from various metals and are suggested for metal cleaning in power washers as they are non-foaming and efficient detergents.

The Pluronics show promise for the passivating of metal as they are completely stable at room temperature in concentrated nitric acid.

METAL CUTTING COOLANTS

The liquid Pluronics appear to be extremely promising for use as coolants for metal cutting machines. A recommended concentration is 0.03-0.1%. In addition to the fact that the Pluronics do not foam appreciably, they also contribute some lubricity to the solution

For most purposes, particularly with non-ferrous metals, the Pluronics may be used as received. If corrosion is a problem, small amounts of sodium dichromate, sodium nitrite or sodium benzoate may be used as an inhibitor.

PAPER

Absorbent Paper

Mill evaluations have shown Pluronic F68 to be superior to any other surface active agent for improving the absorbency of paper towels. Pluronic F68, being a solid, does not migrate into the fiber as do liquid nonionics, and thus retains its effectiveness practically indefinitely. About 0.1% Pluronic F68, based on the weight of the pulp, is a suitable percentage for most applications. Additional advantages include the fact that the Pluronic F68 contributes a very desirable dry feel, improves the softness of the towel and is not affected by the acid conditions required when wet-strength resins are used.

The excellent rewetting properties of Pluronic F68 may also be used in the manufacture of crepe paper, sanitary napkins, paper adhesive tapes and other products of a porous nature.

Cleaning Paper Makers' Felts

The Pluronics are particularly effective in cleaning paper makers' felts, increasing the life of the felt by as much as 100%. A suitable formulation is one pound of Pluronic F68 with 30-40 times its weight of sulfamic acid in fifty gallons of water.

Other Applications

The fact that Pluronic F68 is a softening agent for paper, is relatively unaffected by changes in

humidity and is non-toxic, makes this product of considerable interest in the manufacture of papers to be used with foods.

The properties of Pluronic F68 suggest its consideration as a penetrating agent in the cooking of rags and cotton linters, as a dispersing agent in coatings, as a penetrant in pulp defibering, and for curl prevention as well as in the many other uses in the paper industry where the use of a wetting agent is desirable.

PHARMACEUTICAL AND THERAPEUTIC APPLICATIONS

The use of Pluronic F68 is said by one medical research scientist to "open up a new field of medical research." Pluronic F68 has been found to be non-hemolytic and to have no effect on the Rh, A, and B Antigens in human red cell stroma. It has also been reported that the Pluronics, particularly Pluronic L44, showed promise for the aqueous extraction of lipoproteins from brain tissue.

The Pluronics are also being evaluated in the formulations of a dry vitamin product where the Pluronic F68 serves to make the product water soluble.

Other important applications in which the Pluronics are under evaluation are oral hygiene preparations, medicinal tablets, and coated surgical dressings.

PHOTOGRAPHY

Pluronic F68 shows promise as solid, neutral, nonionic wetting agent for use in photographic developing solutions.

PLASTER

Pluronic F68, particularly in powdered form, is a valuable additive to plaster of Paris. Plaster of Paris containing Pluronic F68 is released from the mold much more readily than untreated material.

PETROLEUM

The Pluronics are also of considerable interest in various petroleum applications. They show promise for the emulsification of petroleum oils, and as a wetting agent in oil well acidizing. They are unaffected by salt water or calcium ions and may be used in the presence of strong acids.

Preliminary tests on the Pluronics in secondary oil recovery has shown Pluronic L64 to be quite promising for this purpose.

The Pluronics as they are, or modified by esterification, show considerable promise for use in petroleum demulsifying where water-in-oil emulsions are to be broken.

SOAPS

One of the most promising applications for Pluronic F68 is that of incorporation in a soap-synthetic bar. The Pluronics are relatively non-hygroscopic, are easily incorporated with the soap and contribute excellent cleaning properties.

The Pluronics may also be added to soap in the crutcher and milled directly into the soap. The melting point of approximately 120°F. for the Pluronic F68 makes it particularly attractive for this use. Combinations of Pluronic, soap and sodium carboxymethylcellulose show areas in which a combination of these three products give cleaning properties superior to any of them used alone. The proportions of each product which should be used would depend upon the type of soap and the cleaning conditions. Additional information on a ternary system based on medium titer soap is available upon request.

SOLVENTS

The Pluronics, particularly Pluronic L62, appear to have unusual solvent characteristics. For example, Pluronic L62 can dissolve up to 25% of its weight of iodine and at least 10% of its weight of DDT. The use of the Pluronics as solvents for some types of high molecular weight materials is very promising.

TABLETING

Pluronic F68 appears to be of value as a binding agent for tablets. Pluronic F68 has good binding properties and in addition dissolves readily in water.

TEXTILES

Wool Scouring

The use of surface active agents, together with alkaline builders, has been shown by many woolen mills to be more effective than soap and soda ash for wool scouring. Pluronic L44 has proven satisfactory for this application, contributing all the advantages of other nonionic surface active agents, and adding that of very low foaming. The concentration of Pluronic L44 in the second bowl of the scouring train should be about 0.05-0.1%.

For those mills where soap is used for wool scouring, the addition of a concentration of approximately 0.05% Pluronic L64 in the third bowl for improved rinsing is recommended. The use of the Pluronics also permits the scouring of wool on the acid side, provided corrosion resistant equipment is available for this purpose.

Soaping-off Cotton Prints

Pluronic L64 has been found to be outstanding for soaping-off cotton after printing or dyeing. A concentration of 0.05-0.25% Pluronic L64 is recommended.

Kier Boiling

It is common practice to kier-boil cotton by the use of a mixture of caustic and soda ash at temperatures slightly above the boil. Pluronic L44 appears to be the best suited of the Pluronics for this application, as its wetting ability is somewhat increased by the presence of caustic. Pluronic F68 has also been found of considerable interest, particularly in the kiering of low-grade cotton linters. A concentration of up to 0.2%, based on the total amount of water, is recommended.

Dye Leveling

In dye leveling the Pluronics may be added not only as penetrants, but as dispersants to retard the dye so that level dyeing may be obtained. The Pluronic to be used is largely dependent upon the nature of the dye and the temperature of dyeing. To date, Pluronics L64 and F68 have been found to be most satisfactory for this application. Mill reports state that these products added to the dye bath in small amounts produce very level shades.

The possibility of incorporating Pluronic F68 with a dye as a dispersant is suggested. This product, being solid, may be useful to prepare dyestuffs which redisperse readily.

Pluronics have the additional advantage of being suitable for use in acid solutions. Low foaming properties of the Pluronics are of special interest in those applications where foaming interferes with performance, as in package dyeing.

Continuous Hypochlorite Bleaching

The stability of Pluronic L62 as measured in the laboratory in hypochlorite solutions of the type used for bleaching indicates Pluronic L62 to be sufficiently stable for use in this application. A concentration of Pluronic L62 of 0.1% in the bath is recommended. Such bleaching baths are useful in improving the absorbency of cotton.

Textile Lubricants

Pluronic F68, with no other additives required, makes an excellent textile lubricant, particularly for use with wool. Approximately 1-2%, based on the weight of the fibre, is a recommended starting concentration. Pluronic F68 has the advantages of being non-hygroscopic, non-tacky, and easily removed by water.

Miscellaneous Textile Uses

In the textile industry, other applications in which the Pluronics have shown promise or are under evaluation include these:

1. Pluronic F68 for assisting the removal of sulphur from wet rayon staple.
2. Pluronic F68 for the removal of graphite from lace.
3. Pluronic F68 as an anti-static agent for synthetic fibres.
4. All the Pluronics as emulsifiers for textile resins.
5. All the Pluronics as wool fulling agents.

WATERLESS HAND CLEANERS

Pluronic L62 is particularly useful in waterless hand cleaners as it is light in color. For those hand cleaners in which a dye is used, Pluronic L62 contributes an additional advantage in that it is an excellent dispersing agent for many suitable dyes. Although the ratio of Pluronic to dye will vary with the type of dye used, a ratio of approximately 200 to 1 is typical.

WATER TREATING

One of the outstanding applications for which the Pluronics have received immediate commercial acceptance is their use in boiler-water treating compounds and in cooling water systems.

The efficient dispersing action of the Pluronics effectively reduces the formation of boiler scale. The exceptionally low foaming characteristics of the Pluronics contribute to their advantageous use.

Due to the essentially non-toxic nature of Pluronic F68, its use in the treatment of potable water systems is indicated.

FREE SAMPLES AND DATA

Samples of the Pluronics, a booklet summarizing their physical and surface-active properties, and further information are available on request. Fill in and mail the coupon today. *Wyandotte Chemicals Corporation, Development Department, Wyandotte, Michigan.*

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Wyandotte Chemicals Corporation, Wyandotte, Michigan

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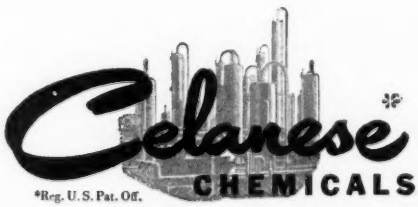

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Chemical Week

BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

NEWSLETTER

New products are the news this week as firms are introducing their research babies to a larger audience:

Baker Castor Oil is readying a series of soy fatty acid esters—e.g., methyl, butyl, propylene glycol.

Glacial (99%) methacrylic acid is now being pilot-planted by Rohm & Haas. The 90% aqueous material has been sold commercially for years, but the new high-purity material is aimed for applications where water must not be present—esterifications, acid chloride formation, certain polymerizations and copolymerizations.

Amine silicofluoride salts are new offerings of Davison Chemical. Their range of usefulness has not been fully explored, so they should provide interesting subjects of research.

Polyethylene carboys (CW, April 12) are now approved by the Interstate Commerce Commission for shipping hydrofluoric acid of not over 60% strength. The pertinent specification: ICC-1F.

Further approvals for other chemicals are expected.

Niagara Mohawk Power Co. may be killing the proverbial golden-egg-laying goose. Its proposal to the State (N.Y.) Public Service Commission to boost its $16 million revenue from industrial users by another $2 million has met with strong opposition; and now Oldbury Electro-Chemical, in protest against the rate hike, is going to put a new multi-million-dollar plant in Mississippi rather than in the Niagara Falls area (see p. 16).

Other firms threaten similar moves if the hike goes through.

Another battle is shaping up in Texas as the state seeks to retain its tax on natural gas gathering, declared unconstitutional by a Federal District Court (CW Newsletter, Aug. 2).

The fight will move to the Court of Civil Appeals (Austin) January 21, and it looks as if it will be fought all the way to the U.S. Supreme Court before the issue is finally settled.

The state collected about $11 million during the 11 months' operation of the law, but about $7 million of that is tied up in lawsuits.

Company officials at last week's meeting of the National Industrial Conference Board were told by Paley Report's William S. Paley that a threefold approach was necessary to solve our material shortages: more power, more substitutes, more imports.

But Manufacturing Chemists Association's Maury Crass, in a round-table discussion at the same session, repeated the familiar points that American chemical producers raise about foreign competition: lower European chemical wage rates (a third to a fifth of ours) and cartelization which thwarts our exports put U.S. producers at a disadvantage.

Look next for a salt-based chlorophyll toothpaste. A large salt company has devised a formulation, is now test-marketing the product.

Use of nitric instead of sulfuric acid to acidulate phosphate rock is catching on more and more:

• Allied Chemical & Dye's nitrogen division will use the process at its $6 million South Point (Ohio) plant for which a fast write-off certificate was recently granted (*CW*, Sept. 20).

• Northern Chemical Industries will employ the process near Sandy Point, Me. (*CW*, Sept. 20); will use nitric from ammonia made in its own 70 tons-a-day plant.

• Associated Cooperatives, Inc., will also use nitric acidulation at its 60,000-tons-a-year unit in Sheffield, Ala.

• Mathieson Chemical, which, like Allied, is a big sulfuric producer, is studying the process; Chemical Construction Corp. has a pilot plant as does Imperial Chemical Industries; and many European plants are using nitric acidulation commercially.

Reasons behind the trend: savings on sulfuric, which is either partially or wholly replaced; and inherent economy. TVA, which developed the method, says that a producer with captive ammonia or nitric acid facilities can make the cheapest phosphate fertilizers in the world.

But not all fertilizer emphasis is on nitrophosphates. Phillips Chemical, already a maker of ammonium sulfate and ammonia, will build a 405 tons-a-day triple superphosphate plant near Houston.

Also in the Southwest, plastic-glass fiber laminates are battling steel as a material of construction for oil storage tanks. Murdock Tank (Tulsa) now has such tanks on the market, National Tank (also of Tulsa) is testing its own design.

Holding 250 to 3,000 bbl., the tanks are made in a metal die press, weigh only a quarter as much as steel, are resistant to acids, brine, solvents and crudes. Limitation: They can't be used continuously at temperatures over 250 F.

Underground storage of liquid propane in old salt beds is coming in for a lot of attention; many formations exist in the Southwest where leakage under pressure is a minor problem.

Look for more stable propane prices if this technique catches on. Off-season gas can then be stored economically to meet peak demand.

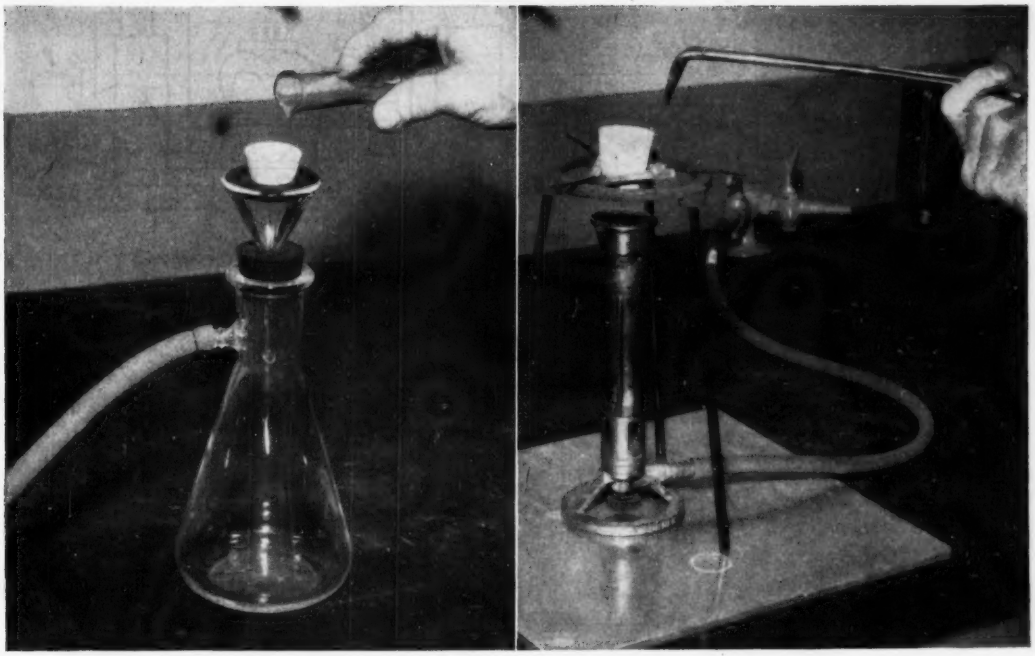
Water purification with colloidal silver is another development to watch. Developed by Czech Chemist Zdenek Moudry, the colloid-stabilized silver suspension has been studied here by the Army and the U.S. Public Health Service. Zdenek retains commercial rights, and production for industrial use is now being carried out by U.S. Movidyn Corp. (Chicago).

One part of silver per 10-20 million parts of water kills microorganisms, has long-lasting residual effect. Potential outlets: municipal water supplies, private wells, swimming pools.

Army Chemical Corps' Pine Bluff Arsenal (Ark.) is now being put on the "industrial fund" accounting basis, already in use at Rocky Mountain Arsenal (*CW*, Sept. 8, '51). It helps put operation on a business-like basis, shows up poor management.

Deadline for comments on proposed changes in the Federal Insecticide, Fungicide and Rodenticide Act has been extended to October 15. Changes would set up a method for registration renewals, would tighten up on permits for experimental work. Address the Insecticide Division, PMA, U.S. Department of Agriculture, Washington 25, D.C.

. . . The Editors



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BUSINESS & INDUSTRY . . . . .

Tapped by AEC

Operating contractor of the Atomic Energy Commission's new $1.2 billion uranium-235 plant to be built in Pike County, Ohio, will be Goodyear Tire & Rubber Co. AEC made its selection public last week, ended speculation about which of the many companies under consideration would be tapped for the job.

Goodyear will take over individual units of the plant as they are built. It won't be entirely on its own in putting the gaseous diffusion plant into operation, however.

Union Carbide and Carbon Corp., present operating contractor for AEC's gaseous diffusion plants at Oak Ridge, Tenn. and Paducah, Ky., will work with Goodyear. Carbide will also help train key Goodyear employees.

The plant, to occupy a 6,500-acre site, will be four years a-building.

Fiber Paradox

The Federal Trade Commission last week was asked by a wool producers group to investigate advertising of "miracle fibers."

This request came from the American Wool Council, one of the organizations which merged 43 months ago into the Wool Bureau, Inc., but which, by some strange alchemy, reappears to lend the "American" in its title to any pro-wool statements addressed to U.S. Government agencies.

Specifically, the group asked the FTC to scan certain advertisements for Dacron-content fabrics, and in addition, requested that agency to check into ad campaigns for other synthetics.

FTC, the growers believed, should "use its powers to regulate the present campaign in which certain synthetic fiber producers and distributors make unfair comparisons of their products with wool, to the detriment of the public."

For its part, the FTC declines to acknowledge receiving the complaint, since its rules of procedure preclude any statements until its examiners have checked the evidence.

Industry men, while never denying that there have been some abuses, feel FTC will find that the overwhelming percentage of both trade and consumer advertising has been above suspicion.

In fact, some of them think that the newspaper headlines which resulted from the wool group charges may be an unrecognized blessing. The publicity may emphasize to the retailer more forcefully, perhaps, than producers can themselves, the continuing need for accuracy and fairness in fiber advertising.

Bet on Good Times

An indication that business doesn't believe a recession is just around the corner is implicit in the latest U.S. Department of Commerce-Securities and Exchange Commission survey of expected industrial capital expenditures.

And business thinking also seems more bullish than it was earlier in the year, since present estimates for over-all capital expenditures of $14.3 billion for the second half of 1952 are higher than earlier Commerce-SEC surveys had indicated.

Chemical Outlook: Companies in the chemical and allied products field plan to spend about $800 million on new plant and equipment in the July to December period.

Spending for the year will reach $1,503 million, the agencies believe. This almost coincides with the earlier (*Feb. 23*) Chemical Week estimate of $1,464 million.

But whoever's estimates you take, they show a sizable increase in plant expenditures over previous years not only for chemical manufacturers themselves, but also for the chemical process fields in general.

Largest expenditures (*see chart*) come in the petroleum and coal products group, though this is one of two classifications where present estimates are lower than previous ones. The decrease—a moderate one—is primarily in estimated expenditures for petroleum and gas extraction facilities.

But the blots are minor. It adds up to the fact that businessmen are betting real money on good times.

CAPITAL EXPENDITURES BY INDUSTRY

(millions of dollars)

	1945	1947	1949	1951	1952 (est.)
Chemicals and Allied Products	$376	$1,060	$ 670	$1,283	$1,503
Petroleum and Coal Products	879	1,736	1,789	2,014	2,812
Paper and Allied Products	116	371	298	489	423
Rubber Products	118	143	81	187	267

Plenitude of Politics

Ending their convention season last week, the labor unions representing chemical processing industries appear to be more intimately embroiled in partisan politics than ever before.

Besides hearing numerous speeches by office-holders and candidates of both major parties, these unions have been adopting policy resolutions that pledge union support to various candidates and issues during the coming year.

Progressives Get Nod: Generally, the tendency was to back the Democratic ticket, but one notable exception is the Mine, Mill & Smelter Workers' political resolution. It does not officially endorse any slate, but says Gen. Eisenhower is "out of the question"; Gov. Stevenson is "the choice of the financial interests he represents"; and the Progressive Party is seeking "an end of the cold war, wage freeze, inflation, high taxes and the defense program."

Mine-Mill voted to hold next year's convention in Denver, marking the 60th anniversary of the founding of its fore-runner, Western Federation of Miners.

The AFL Chemical Workers re-elected H. A. Bradley, the only president their 12-year-old union has had, and all other incumbents. Only new man in the lineup is Marshall McClure, filling the vacated office of District 9 vice-president.

Plug for Adlai: ICWU's only political resolution adopted calls for more federal housing, but the executive board's report includes a strongly worded statement urging the members to vote for Stevenson.

After their reelection by nearly 600 delegates in Asbury Park, N. J., L. S. Buckmaster is beginning his eighth one-year term as president of the United Rubber Workers (CIO) and Vice-president Joseph W. Childs and Secretary-treasurer Desmond Walker are starting their fourth terms.

Buckmaster is asking his close-to-

200,000 members to help defeat "reactionaries in both political parties" whom he accuses of "riddling the controls program for certain special interests"

Incumbents Win: Some 500 United Paperworkers (CIO) delegates in New York reelected President Harry Sayre and Secretary-treasurer Frank Grasso, and heard a noted CIO leader denounce Eisenhower for "succumbing to Senator Taft" Jacob S. Potofsky, president of Amalgamated Clothing Workers, asked the Paperworkers not to forget "the advances made during the past 20 years under the New Deal and the Fair Deal."

COMPANIES. . . .

Shawinigan Chemicals is considering getting around sterling payment limitations by setting up a factory in Great Britain to produce calcium carbide and related chemicals. At present, Britain is importing a number of these materials from the European continent, where producers will accept sterling in payment.

•

Calumet & Hecla Copper may diversify into the plastics field. The company's stockholders will be asked (Oct. 21) to amend the company charter to allow it to go into such fields as plastics production.

•

Phillips Petroleum has taken another $20 million of a standby credit loan arranged with 13 banks last year. Total borrowed so far: $55 million. The promissory notes, due from 1953 through 1957, carry 2.75-3.0% interest rates.

•

Tennessee Products & Chemical has placed a $5 million 4.5% loan with eight institutional investors. The funds will be used for expansion and debt retirement.

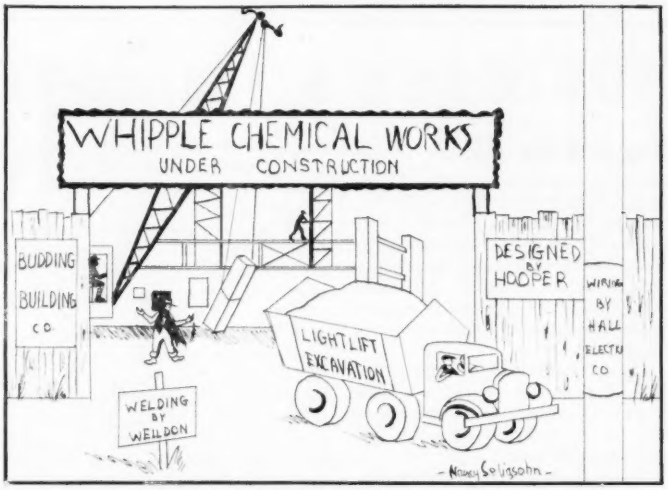
•

Smith-Douglas, Norfolk, Va., fertilizer mixer, will acquire Coronet Phosphate through an exchange of stock. Better than 98% of the common stock was acquired when the offer was made to stockholders of the Florida phosphate rock concern.

• Smith-Douglass has borrowed $6 million at 3.875% from two insurance companies in connection with the purchase.

•

Foster Wheeler (New York) and Pioneer Service and Engineering (Chicago) will conduct a 12-month survey on the feasibility of privately constructed plants for producing electricity from atomic piles.



CPI PLANT SUBCONTRACTORS: It doesn't happen in Europe, but wide use of sub-contracting has helped push U.S. chemical industry into world leadership.

Vantage in Practicality

How did the United States' chemical industry, "comparatively undeveloped" in 1917, advance so rapidly that by 1949 it made 67% of the free world's total synthetic organic products? This question so perturbed a European technical team visiting 20 American companies to study industrial chemical equipment that it devoted much of a one-month tour to searching for the answer.

Instead of using the self-excusing explanation that chemical processing industires in the U.S. "couldn't miss" because of their good fortune in having plenty of raw materials and in escaping the ravages of two world wars, these visiting technicians scrutinized every plant they saw, looking for the real reasons.

Engineers Get Credit: They single out Yankee chemical engineers for particular credit; give management a hearty pat on the back for having "progressive attitudes"; and commend the CPI for use of teamwork.

"It must be emphasized," the European visitors now remark in retrospect, "that a large part of the success of the great American achievements in industrial chemistry is due to the efficiency of the chemical engineer." They say that chemical engineers are employed to a much greater extent in the U.S. than in Europe; that very few (if any) European schools at present can meet all the chemical engineering educational standards of American professional groups; that:

"Europe must learn that substantial investments in chemical engineering pay high dividends."

Unfeigned Flattery: In recommending that European industrialists ponder ways to adapt American methods to European manufacturing, the wayfaring technicians paid genuine tribute to American CPI managers.

These are some of the things the Europeans admired in Yankee CPI management:

• Ensuring that progress is rewarded, and that opportunities for gaining reward are open to all.

• Organizing activities on a specialist basis, and providing training courses for specialists.

• Extensive employment of highly trained technicians and advanced personnel management with incentive schemes and delegation of authority.

• Emphasis on application engineering and commercial exploitation.

• Willingness to try out new ideas and to replace out-of-date conceptions when new ones have proved their value.

• Willingness to subcontract and to put efficiency before self-sufficiency and prestige.

• Wide circulation of general chemical engineering information.

• Adoption of the principles of standardization and simplification as general rules for reducing costs.

"Most Cordially Received": The touring technicians were sent here by the Organization for European Economic Cooperation, an association

143-S

through which the member nations have been coordinating their post-war recovery programs to provide for most effective use of U.S. aid. This delegation was known as Technical Assistance Mission No. 23, and its assignment was to study methods used in design, construction and operation of chemical plants.

The 11 delegates arrived in New York on Sept. 27, 1950, and were glad-handed at every stop, according to their report.* "Everywhere the Mission was most cordially received," writes Professor S. G. Terjesen (Norwegian Institute of Technology), who edited the book. "First-class experts were generally placed at the disposal of the mission, and questions were answered willingly."

They pin up as a helpful motto for Europeans this doctrine, which they say they've found to be an "overriding principle" in U.S. industry:

"The good management of a firm implies not only that the most capable and conscientious are placed at the controls, but that the less talented also give of their best, cooperating whole-heartedly and ungrudgingly."

Keen Competition: After enviously eyeing the mechanical assets of the CPI in America, the travellers came up with these conclusions about Yankee plant equipment:

- General level of instrumentation in the U.S. is considerably higher than in Europe.
- Rapid progress in instrumentation has been very much assisted by industry's willingness to try out and help develop new equipment.
- Less than a dozen makers supply the bulk of the chemical apparatus demand, and are large enough to support really effective development teams.
- Competition among these makers is keen and produces a very high standard of equipment and accelerates development trends.

Vanity Is Costly: While European companies often refuse to let subcontracts on new installations because of a fear that this would hurt their prestige, Yankee companies have won the visitors' esteem by not letting pride stand in the way when a sub-contractor can do the job better and more cheaply.

"The condition that the job must be better and cheaper is rigidly observed," Terjesen writes, "and a firm would not hesitate to change from an old reliable supplier to a newcomer if the latter could offer substantial advantages. Even the largest chemical engineering contractor would not contemplate designing his own pumps, filters, centrifuges and instruments. Such items are left to highly specialized and competent firms on whom the main contractor can usually rely to provide the most suitable equipment for any requirement."

Teamwork Pays Off: "In the United States," the visitors remark, wistfully, "the manufacture of chemical and petroleum products is organized on a 'specialist' basis to a degree unknown in Europe." One large chemical engineering contractor impressed the guests by describing his firm as a production line in design, with each project passing through the hands of more than 50 engineers.

This technique, they observe, is used also for development work and even in research. Most of the important recent developments in the U.S. chemical industry, they relate, cannot be traced back to any particular individual; they are the result of the cooperative efforts of many specialists.

Also Winning Plaudits: American management's readiness to try new ideas, thus constituting an incentive and encouragement to inventors and researchers; and American industry's willingness to let its scientists publish technical papers that contribute to the general pool of knowledge. (Most European firms still maintain "indiscriminate secrecy.")

Helsinborg to Milwaukee: The European experts visited seven chemical engineering contractors, eight manufacturers of chemical equipment and control devices, the U.S. Bureau of Standards in Washington, the General American Transportation Corp. in Chicago, and three producers.

Stopping points were M. W. Kellogg, Lummus Co. and Foster Wheeler Corp., New York; Houdry Process and Sun Oil Refinery, Marcus Hook, Pa.; Brown Instruments Division and Leeds & Northrup, Philadelphia; Koppers, Alleghany Ludlum and Alcoa, Pittsburgh; Babcock & Wilcox, Barberton, Ohio; Chicago Bridge & Iron and Podbielniak, Inc., Chicago; A. O. Smith Corp., Milwaukee; Pfaudler Co., Rochester, N.Y; Stone & Webster and E. B. Badger & Sons, Boston; and Bird Machine Co., South Walpole, Mass.

Their report is a flattering portrait of America's CPI, but Yankee managers shouldn't let this encomium lull them into complacency. The report also is a bugle call to European chemical companies, urging them to catch up with U.S. rivals.

* Copies of the 224-page report, "Chemical Apparatus in the U.S.A.," may be ordered through International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y. Price: 1,000 francs, or about $3.50.

LABOR

Bargaining Ballots: Setting a good example for the nation (only about 50% of the U.S. electorate bothered to vote in November 1948), some 90% of the workers at two large chemical plants voted in the latest NLRB bargaining elections, but in both cases, results still are in doubt.

- At Du Pont's neoprene plant at Louisville, Ky., where about 1,400 employees had a choice of five unions or no union, 1,310 persons cast ballots. Results: International Chemical Workers Union (AFL), 445; Neoprene Craftsmen Union, 360; Affiliated Chemical Workers of Kentucky, 332; United Rubber Workers (CIO), 135; Brotherhood of Firemen & Oilers (AFL), 25; no union, 6; void ballots, 7; challenged ballots, 5. It's expected that NLRB will arrange a run-off election next month between the two top vote-getters.
- At the Squibb plant in New Brunswick, N.J., the NLRB's ruling on 19 challenged ballots will determine whether the United Gas, Coke & Chemical Workers (CIO) will become bargaining agent for 1,787 employees. In last week's poll, Gas-Coke received 816 votes and 798 went to "no union." Gas-Coke, which since 1947 has been trying to organize the New Brunswick plant, already is bargaining agent at Squibb's Brooklyn and Long Island City works and at two Squibb subsidiaries, Lentheric and Globe Collapsible Tube. If the union wins the verdict at New Brunswick, it will seek to deal with Squibb on a company-wide, master-contract basis.
- At Mathieson's plant in Morgantown, W.Va., the NLRB has ordered seven separate elections to be held for these groups of workers: electricians, pipefitters, welders, instrument repairmen, machinists and bench mechanics, millwrights, and all other production and maintenance workers. At present, none of the approximately 1,200 employees is represented by a union.

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Pickets on the March: Strikes are still dragging along at a number of chemical plants, and elsewhere there has been discord in the wake of strikes that were supposedly settled.

- At Corpus Christi, Texas, some 475 members of Gas-Coke local 153 have struck the Columbia-Southern plant, halting all production but allowing construction workers to go to work on the property. About 200 office workers also are staying on the job. It was the first strike for this 18-year-old plant. President R. M. Rigby of

143-S

Local 153 says his members don't like proposed terms on wages and working conditions and "job inequities." The company has offered a choice between a one-year contract with an 11¢/hour wage increase and a three-year pact with a 7¢ rise.

• In Youngstown, Ohio, Republic Steel's coke plant has been plagued by unauthorized walkouts involving about 300 men, reportedly unhappy with the incentive wage system. President Charles Kalby of United Steelworkers Local 1331 exclaims that "the men had no business at all stopping work."

• Violence cropped out at Lake Charles, La., where some 400 AFL metal trades workers have been on strike against Firestone Tire & Rubber for about a month over alleged wage classification inequities. Plant Superintendent W. H. Cain was stopped on a highway, pulled from his auto, and attacked. He managed to break away from his assailants and hid in nearby underbrush until the sheriff and state troopers arrived.

• United Paperworkers of America (CIO) are keeping out of production all three of the West Virginia Pulp & Paper plants where they represent the workers: Williamsburg, Pa.; Luke, Md.; and Covington, Va. Their strikes began Aug. 21 after six weeks of fruitless negotiations.

• The "Big Four" rubber companies have all signed new contracts with United Rubber Workers (CIO), but the Akron labor scene still is not wholly sweetness and light. URW's biggest Firestone local, No. 7, has rejected the contract and has asked URW's international executive board to decide what to do next. Also at Akron, the Goodyear rim plant has been practically idled because of a wildcat strike of about 470 production workers. Goodyear has suspended 92 employees for one week for taking part in the stoppage.

•

Sugar in Settlements: Wage increases have helped to soothe wounded feelings among employees at chemical process plants.

• After a three-week shutdown caused by a machinists' strike, U.S. Rubber has reopened its plant in Port Neches, Texas. There was some delay in ratification of the contract by members of Lodge 1792, International Association of Machinists.

• AFL Flint Glass Workers are back at work after a five-day strike that helped them win a 10¢/hour wage boost. About 7,500 employees took part in the nation-wide stoppage.

• At Ashtabula, Ohio, National Distillers Chemical and Gas-Coke union have agreed on a new contract running to Dec. 31, 1953, and providing for wage increases and fringe benefits worth a total of about 19¢/hour for approximately 260 employees. The 12¢ wage hike is subject to WSB approval. Shift differentials are up to 10¢ and 15¢, and the contract includes a non-contributory occupational disability plan.

• CIO Oil Workers have accepted a settlement with Shell Oil, Shell Chemical and Sand Shell Oil for plants near Houston, Texas. Terms were not announced immediately. Reportedly included in the agreement: back pay estimated at $150,000.

CURRENT LIST OF DPA-CERTIFIED FACILITIES

Company, Location	Product	Amount Certified	% Certified
Shea Chemical, Columbia, Tenn.	Elemental phosphorus, dicalcium phosphate	$2,054,530 381,684	45 40
International Minerals & Chem., Polk County, Fla.	Uranium	800,000	75
U.S. Steel, Kaiser Steel, around Columbia, Utah	Coke, coal chemicals	545,500	50
Allied Chemical & Dye, Youngstown, Ohio	Coal tar chemicals	1,516,000	60
Phillips Oil, Phillips, Tex.	Cyclohexane concentrate	371,000 145,900	65 50
Industrial Tape, Elkhart, Ind.	Industrial tape	3,272,330	65
Wyeth, Marietta, Pa.	Antitoxins, biologicals	307,519	45
National Drug, Swiftwater, Pa.	Vaccines, antitoxins	83,314	45

EXPANSION. . . .

Titanium: Quebec Iron & Titanium (New Jersey Zinc and Kennecott Copper joint subsidiary) has begun operation of the second electric furnace at its Sorel, Que., refinery. It produces iron and high-titanium dioxide slag. The third furnace is now expected to be in operation by the end of the year, with the remaining two to go on-stream during 1953.

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Chlorates: Oldbury Electro-Chemical has changed its mind on location of a projected $3.5 million plant. It will build in Columbus, Miss., rather than at Niagara Falls, where its present manufacturing facilities are located. Reason: Niagara power costs are already high, and may go higher, if the state public service commission allows a presently requested rate increase.

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Fibers: Add saran to the list of fibers actively competing for the consumer dollar. Last week, Saran Yarns (owned by Dow Chemical and National Plastic Products) exhibited apparel, upholstery, and carpeting fabrics containing 100% saran or blends of fine-denier saran with other fibers.

•

Coal Chemicals: Algoma Steel will construct 57 new chemical-recovery coke ovens at its Sault Ste. Marie, Ont., plant. Koppers has been awarded the construction contract.

Sulfur: Almost coincidentally with its stock offering (*CW, Sept. 20*), Gulf Sulphur (N. Kansas City, Mo.) reported that it had found "some of the richest elemental sulfur deposits producible by the Frasch process from brimstone in the world" on its Mexican properties.

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Aluminum: Alcoa, which last week dedicated its still a-building Wenatchee, Wash., aluminum production facilities, received some other reactions on its newest baby—the integrated plant to be located near Skagway, Alaska.

• Said Interior Secretary Oscar Chapman: His department approves "in general," but if the company buys the land it wants in the Taiya Valley (near Skagway), some space should be left for other landowners.

• Canadian observers have now made a new point: Let's work a horse trade—if we get active help from Washington on setting up the St. Lawrence Seaway, we'll give the Canadian water rights which Alcan wants.

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Pulp and Paper: Alaskan industrial development men last week were bandying about the figure $100 million as the cost of a projected pulp and paper mill to be built near Juneau.

•

Ordnance: The first six production lines at the Du Pont-operated Indiana Ordnance Works (Charlestown) have gone into operation. Originally, they had been scheduled to go into production in July (*CW, Jan. 26*). Artillery propellant powders and small arms ammunition are to be manufactured.

• Incidentally, the Chemical Corps opines that its policy of leasing standby munitions plants instead of mothballing them is paring millions from (1) the cost to taxpayers and (2) the size of Chem Corps expenditures. Of the $183 million worth of plants it held in fiscal 1951, facilities valued at $71 million were leased to commercial firms. Yearly rental totaled $1.2 million, where mothballing the plants would have cost an estimated $1.5 million.

$250,000 more output with Farval

FARVAL—*Studies in Centralized Lubrication No. 88*

IN the tire and tube department of a rubber company, it was necessary to shut down the vulcanizers to lubricate them by hand. A study by the Methods Department showed that the production lost during this shutdown time was equivalent to the full output every day of five vulcanizers. Measured in tires and tubes not produced, the indicated annual loss was well over 50,000 units. Additional vulcanizers to make up this loss would have cost more than $45,000.

The company turned to Farval Centralized Lubrication, for with Farval it is not necessary to stop machines to lubricate them. By eliminating the need for additional vulcanizers and through savings in labor and lubricant, the Farval installation would pay for itself in less than 10 months. And the value of the tires and tubes to be produced in the time saved is well above a quarter million dollars.

Farval delivers oil or grease under pressure to a group of bearings from one central station, in exact quantities, while a machine is in operation. Farval is the Dualine System with the Positive Piston Displacement Valve. This valve has but two moving parts and is fully adjustable, with a Tell-tale indicator at each bearing to show the job is done. For a full description of Farval, write for Bulletin 25. The Farval Corporation, 3291 East 80th Street, Cleveland 4, Ohio.

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MANUFACTURERS OF FAMOUS 20 MULE TEAM PACKAGE PRODUCTS

EMPLOYEES' FORUM: Members of Tracerlab's auxiliary board thresh out blueprint problems with production manager and chief engineer.

New Help for Top Brass

Pioneering on two fronts—atomics and industrial relations—is a six-year-old Boston company whose 1951 sales topped the $12 million mark for a jump of more than six-fold.

On the scientific side, Tracerlab, Inc., synthesizes isotope-tagged compounds and builds industrial instruments for detecting and measuring radioactivity. On the industrial relations side, Tracerlab is keeping its plant "family" of 500 employees happy and operations running smoothly through its novel "Auxiliary Board of Management."

This auxiliary board is made up of employees from all departments of the plant. Its two-fold job: to help the board of directors manage the company; and to train employees in company operations.

Clearing House: The auxiliary board also serves as a clearing house for employees' ideas and as a forum for the expression and discussion of employees' opinions. All company business except wages is grist for the junior board's mill.

And although this board has not been taking a direct hand in employees' working conditions, usually leaving such matters to Industrial Relations Manager Robert Bogner, the workings of the auxiliary board appear to have imbued the production and maintenance workers with a sense of intimacy and loyalty toward the company. Several bargaining elections have been held at the Tracerlab plant, and every time, the employees' voting indicated that they were satisfied without a union.

Helps Top Management: Sponsor of Tracerlab's "multiple management" plan is S. Sydney Minault, vice-president and general manager, who patterned the scheme on a program devised by a spice company in Baltimore. Minault feels that the system is proving to be of value in bringing recognition of problems and of opportunities for improving operations.

Guy Detellis, a supervisor in the methods department, is current chairman of the auxiliary board. Right now, all other members are either supervisors or foremen, but membership is open to all employees. Regular members' terms are six months, and no one may serve more than four terms in a row. New members are chosen by the auxiliary board's membership committee. At least two meetings are held each month, and special meetings may be called by the chairman when there is extra business to consider. Recommendations handed up to the Board of Directors must be unanimous.

One way the auxiliary board helps the company, Detellis says, is by putting problems into recognizable and concrete form, making it easier for the top "brass" to make decisions.

Agenda Samplings: The junior board now has worked on problems relating to nearly every phase of the firm's operations. At the first regular meeting this month, the members took

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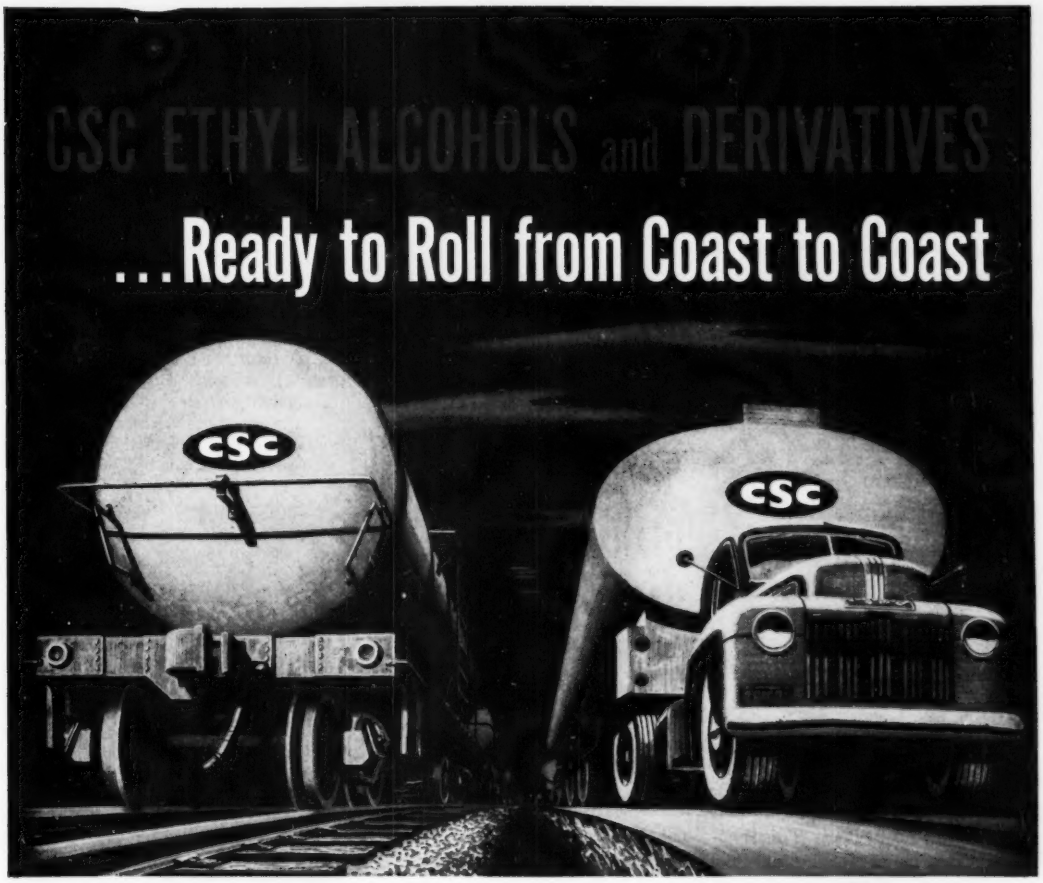

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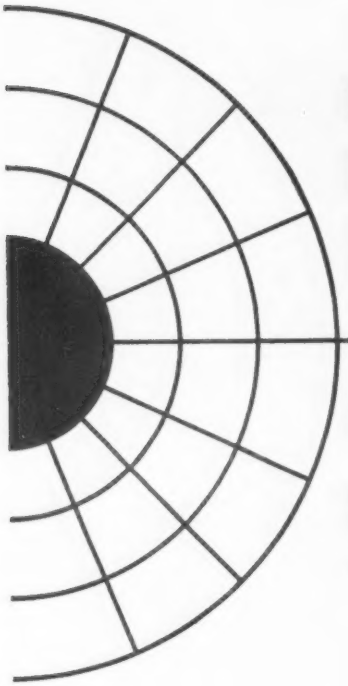

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up various proposals for improving plans and blueprints used in production.

Company innovations that were adopted at the suggestion of the auxiliary board are legion; they range from a blood donor program to an up-grading program in which all vacancies are posted on bulletin boards so that employees have full opportunity to apply for higher-paid or more challenging positions.

Most of the junior board's accomplishments have been achieved without action by the Board of Directors. Although the senior board gets a complete copy of the auxiliary group's minutes of each meeting, many of the suggestions can be taken directly to supervisors, foremen or employees concerned.

BANKING ON EMPLOYEES: Tracerlab's Barbour and Minault.

Gaudy Growth: Many small companies were founded in 1946 to deal in radioactive substances, but only Tracerlab has grown to the point of having a branch laboratory (Berkeley, Calif.); seven sales offices in the U.S. and one in Paris; 22 foreign distributors throughout the free world; and a subsidiary, Kelley-Koett Manufacturing Co.

William E. Barbour, Jr., president of the concern, claims for his firm the honor of offering the largest number (now more than 300) of chemicals tagged with radioactive isotopes. Tracerlab has conducted numerous research products for the U. S. Defense Department, Atomic Energy Commission, and for private companies. It sells control devises and other instruments to schools, colleges, hospitals, public and private laboratories,

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Viscosity, centistokes	
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. . . . . .

and to certain firms for production control.

To keep this robust young business running on even keel, Barbour and his Board of Directors are counting on all interested employees to participate in managerial work through their auxiliary board.

LEGAL . . . . . .

Fight Utility Rate Rise: Six chemical companies are among 17 concerns that have teamed up to oppose a rate increase proposed by Niagara Mohawk Power Corp. They will tell the New York State Public Service Commission at a hearing in Buffalo that Niagara Mohawk is enjoying its highest earnings in history and doesn't need higher rates. The utility wants to boost power charges for some 500 industrial and commercial users to bring rates more nearly into line with those of other electric companies in the East. Hooker Electrochemical, second largest user of power at Niagara Falls, would pay 20% more than its present $630,000-a-year electric bill if the rate increase is granted. Other chemical companies objecting: Durez Plastics & Chemicals, Buffalo Electro Chemical, International Graphite & Electrode, Oldbury Electro-Chemical, and Stauffer Chemical.

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Salvaged Sulfur: Uncle Sam is suing a New York firm for treble damages totaling $141,394.50 on a charge of selling sulfur above the OPS ceiling price. The petition states that the O'Donnell Transportation Co. bought 604¼ long tons of sulfur that had been recovered from the hold of the S.S. Arizona, a merchant ship that sank in the Cape Cod Canal in May, 1951, with 5,000 long tons of sulfur on board. U. S. Attorney Myles J. Lane says O'Donnell paid $60 a long ton for the sulfur and sold it at $110 per long ton to a West Coast paper maker, without regard to legal ceilings and without applying to OPS. O'Donnell owns a fleet of tugboats, sometimes deals in ship salvage work.

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"Piecemeal Infringement": Charging that two Philadelphia chemical companies are joint infringers of a patent on synthetic resins, the Ellis-Foster Co. of Montclair, N.J., has filed suit in Philadelphia against Rohm & Haas and the Lee Plastics Co. The patent involved, No. 2,255,313, was issued in 1941 on an invention in ethylenic-alpha-beta resins and a process for making them. The complaint alleges that the defendants are performing separate operations that, added to-

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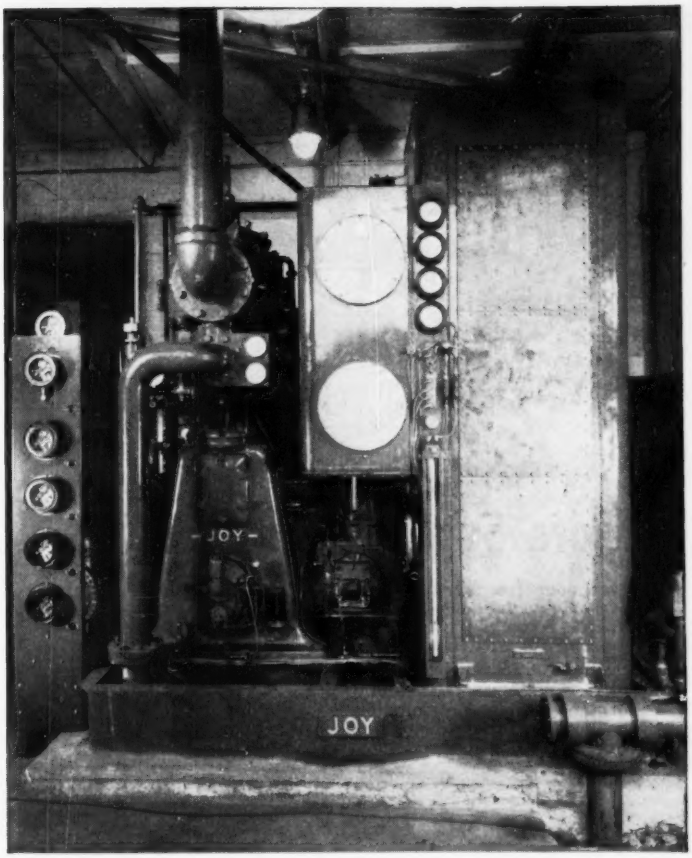

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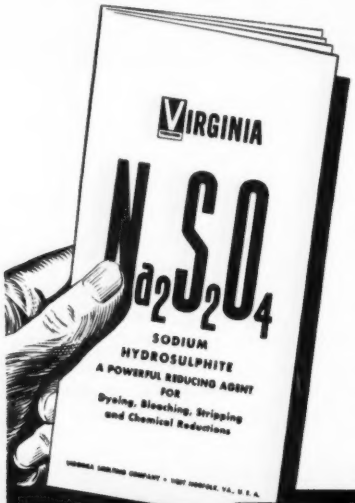
Over more than four centuries of production from cane, many mechanical improvements have been made in the sugar refining process. Some of the more perplexing chemical aspects of the problem are now being solved by VANOL—trade name for "Virginia" Sodium Hydrosulphite.

"Virginia" VANOL successfully copes with the organic colloidal substances which contaminate the sugar solution. These colloids are very hard to handle—to filter, coagulate and remove. They congeal and form sticky, resinous massecuite on repeated boilings.



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gether, constitute an infringement. Ellis-Foster is asking for a preventive injunction and an award of damages and profits for past operations and sales.

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Germs Not Convicted: The New York manufacturer of Jeris Antiseptic Hair Tonic has been accused by the Federal Trade Commission of "misleadingly representing" that the product cures dandruff, itchy scalp, falling hair, and other scalp conditions. The maker, Ar. Winarick, Inc., has been notified that the hearing on this complaint will be held in New York on Oct. 14. FTC contends that the claims are false, and that the claim about dandruff cure is misleading because "it has not been scientifically accepted that germs cause dandruff."

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Salt Tax Lifted: Georgia farmers won't have to pay a state sales tax on salt for livestock, according to a ruling by Attorney-General Eugene Cox. This ruling classifies both plain and mineral salt, in either block or bag form, as "feed" when it is to be used for livestock, and the 3% sales tax does not apply to livestock feeds.

KEY CHANGES . .

Paul S. Bercow: To assistant vice-president, Rosenthal Bercow Co., New York, N.Y.

M. M. Ricketts: To vice-president, Strong Cobb and Co., Inc., Cleveland, O.

Burton W. Graham: To director of technical service, Davison Chemical Corp., Baltimore, Md.

John W. Gendron: To manager, crude and products department, Tide Water Associated Oil Co.'s western division, San Francisco, Calif.

Leland E. Spencer: To assistant to the president, The Goodyear Tire and Rubber Co., Akron, O.

John C. Hajduk: To president, Delft Co., Chicago, Ill.

Henry F. Miller: To vice-president in charge of sales, Powers-Taylor Drug Co., Inc., Richmond, Va.

Albert W. Rawlins: To director, products development, Parke, Davis and Co., Detroit, Mich.

John R. Skeen: To vice-president in charge of research and development, Nuodex Products Inc., Elizabeth, N.J.

T. C. Keeling, Jr.: To deputy director, chemical division, National Production Authority, Washington, D.C.

William A. Santel: To sales manager, fine chemicals department, C. P. Steuber and Co., New York, N.Y.

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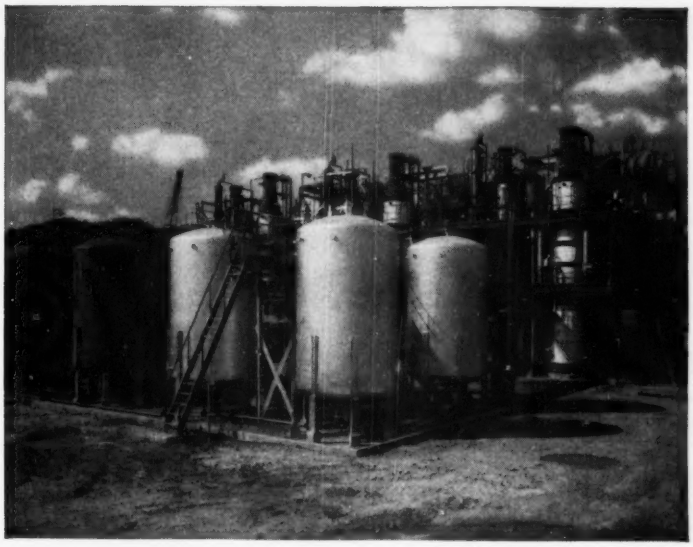

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How a network power system prevents shut downs in this process plant

In the new Lever Brothers' Los Angeles plant, which produces soaps, detergents and edible oils, many of the processes are continuous and power stoppages would be extremely costly. So Bechtel Corp., the engineers and constructors, and Westinghouse applied a very advanced type of power system, a "secondary network", that's just about emergency-proof. Here are a few of the nontechnical highlights.

Substations tied together in network

This system follows the best modern practice of having power substations spotted throughout the plant—each one serving its own area. In addition however, the substations are tied together with emergency cross connections. If there's trouble in any substation, its part of the plant is immediately and automatically served through the neighboring units without even a *momentary* interruption.

No stand-by diesel-generator needed

Power enters the plant through either of two main lines from the utility company. If one line should develop a "fault", the automatic throw-over equipment switches to the other line. This system has such high reliability that no stand-by diesel-generator is needed.

System expanded easily as plant grows

Another important feature of this system is the ease with which additional load expansion can be handled. An increase of 40% in capacity is possible without disturbing the present system.

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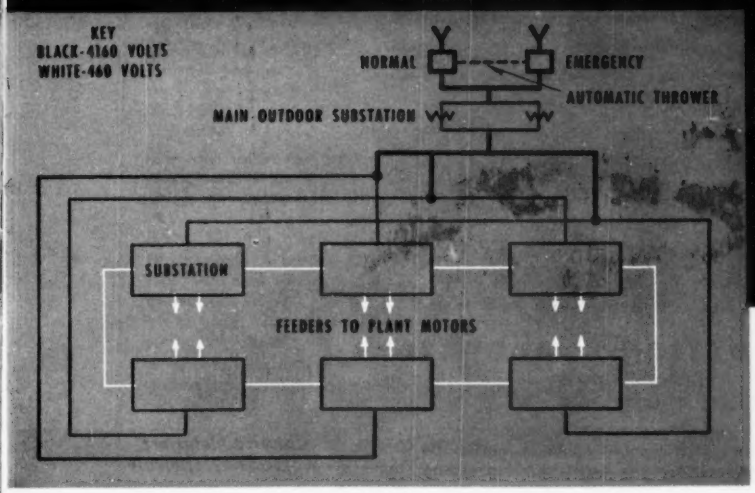
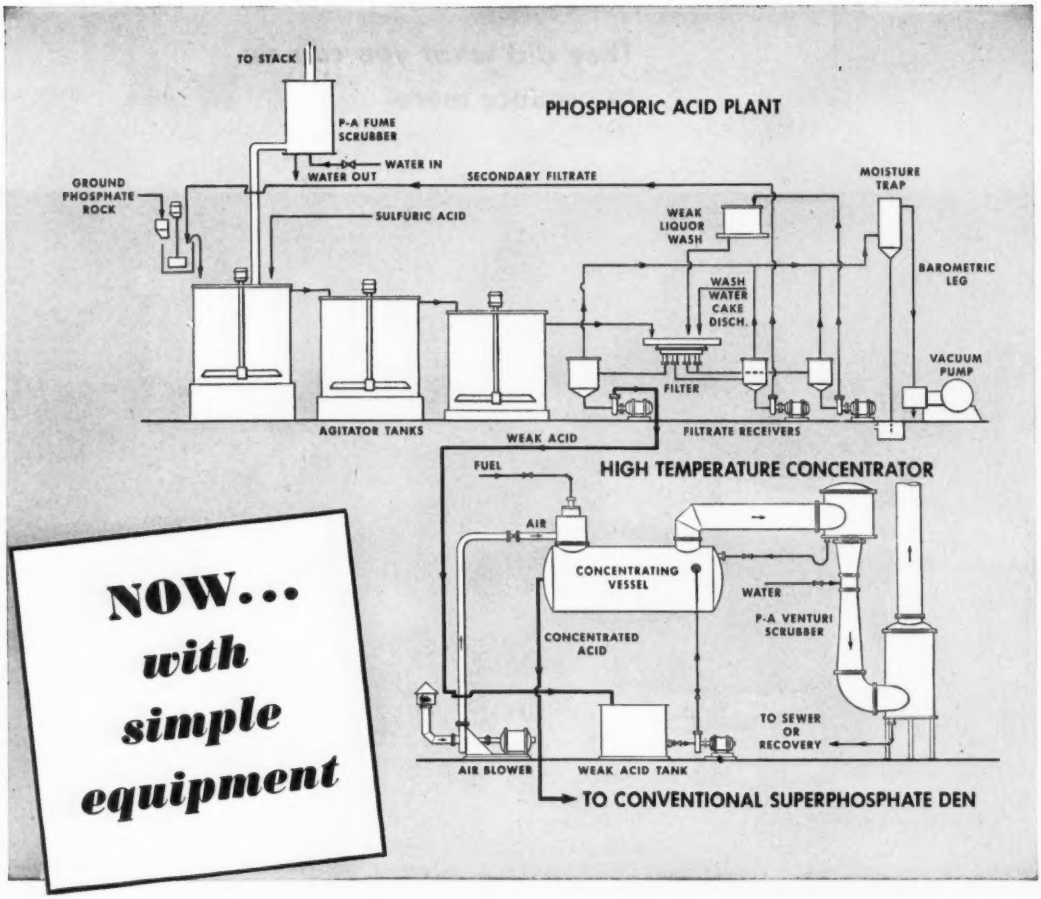


Lever Brothers new Los Angeles process plant has an advanced power system—the "secondary network". Triple feeders and substation cross connections give the system exceptional reliability and make future expansion easy.



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Chemico plants are profitable investments

TABLE 1

WAXES: Availability and Value

(THOUSANDS POUNDS AND $)

	1950		1951	
	POUNDS	VALUE	POUNDS	VALUE
Petroleum Waxes (28% exported '51)	1,249,360	$74,000	1,347,920	$80,000
Vegetable Waxes (Imported)	31,513	25,350	26,340	21,082
Synthetic Waxes	21,000	7,270	25,000	8,800
Insect & Animal Waxes (50% imported)	10,480	5,483	9,778	5,850
Mineral Waxes (75% imported '51)	4,050	1,030	7,646	1,580
Total	1,316,403	$113,133	1,416,684	$117,312

The $100 Million Market for Waxes

Commercial waxes are manifold in number and myriad in uses. Altogether they add up to a whopping $100-million-a-year business.

Who makes which and what are they good for? Here's an up-to-the-minute rundown on statistics, properties, applications—in short, today's dossier on the subject.

by James E. Sayre and Charles J. Marsel

The wax industry is as romantic as any segment of manufacturing; and among chemical industries, which generally have a reputation for guarding information about their operations, it takes a back seat to none in the matter of secrecy.

Many of its products have been used for centuries, and are still produced in foreign lands, and often refined here. Details of techniques used to refine these imported materials, or to process domestic natural and petroleum waxes, are closely held.

Companies marketing such waxes or producing synthetics competitive with them, exercise the same caution regarding markets for their products. Competition is keen, particularly among the lower-volume products; customers are numbered in the hun-

MEET THE AUTHORS

CHARLES J. MARSEL, who has authored previous CW and CI reports, is associate professor of chemical engineering at New York University, University Heights, New York City, and also a consultant specializing in waxes. JAMES E. SAYRE is chief specialist on economics and marketing for Barrett Division, Allied Chemical & Dye Corp. A graduate of Rutgers in business administration, he was executive secretary of the committee which blueprinted Barrett's postwar expansion. As his company connection implies, he is especially qualified in the marketing of coal-tar products.

dreds, are in many separate industries, may buy in lots of only a few pounds. To launch a new synthetic material or a blend with specialized properties is an expensive proposition, requiring much laboratory work, service, and promotion.

And the difficulties of determining markets and applications are further increased by the nature of consumers. Many of these compound waxes with other materials into finished products for sale or for their own use in specialized applications. Such formulators develop much technology in handling waxes, naturally are reluctant to talk about it. Producers often don't know where their materials end up; often, too, are unable to give as much technical help as they might because the customer can't freely discuss his problems.

But despite some hangovers from the days when producing and using waxes were on more of an empirical than scientific basis, waxes have attained a prime position as industrial raw materials. In 1950 U.S. process industries purchased 1.1 billion pounds of waxes of all kinds, both imported and domestically produced, representing a market in excess of $100 million; 212 million pounds more were exported to foreign customers. Data on forward buying, greater exports, and higher producer inventories made it evident that apparent U.S. consumption was closer to a billion pounds in 1951. A comparison of available wax supplies for the two years is given in Table 1.

The producers of these waxes are also good customers of heavy or workhorse chemicals. Mostly running into million pound totals for processing or as raw materials are toluene, benzene, methyl ethyl ketone, acetone, naphthalene, phthalic anhydride, ammonia, and coumarone-indene resins; also chlorine, sulphuric acid, ethylene derivatives, stearic acid, hydrogen peroxide, oils, fatty acids, various filter aids and others. Petroleum hydrocarbons are most utilized as petroleum wax bases.

This lucrative wax market has encouraged the introduction of hundreds of products, which according to origin may be classified as five basic wax types: petroleum, vegetable, synthetic, insect and animal; mineral and wax blends. (Table 2.)

Petroleum Waxes: The petroleum industry has been the bulk supplier, producing 94% of the poundage consumed domestically, 60% of the dollar value. While its waxes are cheap in price and are averaging about 7c per pound at present, some grades of micros range up to 40c. They are used principally in paper containers and candles.

Vegetable Waxes: Considerably smaller both in volume consumed and in total dollar value are vegetable waxes, most of which are imported. These are the long-time favorites of formulators who can afford to pay for their outstanding characteristics, their versatility.

They are relatively high priced—about 80 cents a pound; hence although representing only 3% of all waxes volume-wise, they account for about one-quarter of the valuation of the market. In 1950, imports totaled 31.5 million pounds, but dropped drastically to 26.3 million last year.

Synthetic Waxes: Synthetic waxes produced principally by American chemical companies are next in importance, with a value of $8.8 million for an output estimated at 25 million pounds in 1951. Price averages about 35 cents a pound.

Insect, Animal Waxes: The fourth group comprises the insect and animal waxes, dominated by beeswax. Total consumption per year is 10.5 million pounds worth $5.5 million.

Mineral Waxes: The remaining group (excluding blends of more than one wax or one class of wax), the mineral waxes, is dominated by montans. Volume in 1951 was about 7.6 million pounds, worth $1.6 million.

Ups and Downs: Table 3 listing the volume of these various waxes for 1939-1951 shows these trends:

- Petroleum waxes have grown steadily as compared with the expensive vegetable waxes which have not as yet bettered their 1941 high.
- Animal and insect waxes have trended downward.
- Mineral waxes (including montan), hit by the war, are recovering their former standing; domestic output is rising.
- And though no specific trend data for synthetics are available, authorities agree that their growth, sparked by aggressive chemical producers, has been vigorous.

Some of Each: Blends of different basic types of wax (or of a wax and a non-wax material), though not listed in Table 3, are raw materials of increasing importance. Trend data for this important class, as for synthetic types, are not available either.

But like synthetics, many of these compositions formulated for a specific application have attained considerable stature. Some suppliers of basic waxes are producing blends, and of course, many manufacturers of finished wax formulations make their own.

1950 U.S.

PETROLEUM WAXES*	
Fully Refined	
Microcrystalline	
Crude Scale & Other	
Sub-Total	
VEGETABLE WAXES	
Carnauba	
Candelilla	
Ouricuri	
Sugar Cane*	
Other Vegetable Waxes	
Sub-Total	
SYNTHETIC WAXES (A)*	
Special Synthetic	
Chlorinated Naphthalene	
Hydrogenated Castor Oils	
Imported Syn. (Gersthofen)	
Sub-Total	
INSECT & ANIMAL WAXES	
Beeswax	
Other	
Sub-Total	
MINERAL WAXES	
Montan*	
Ozokerite*	
Sub-Total	
GRAND TOTAL	

WHERE WAXES GO

A few fields consume considerable quantities of wax. But in general, wax products go into a broad variety of applications in a great many industries; purchases are made in small quantities.

The approximate consumption by end use for various types is given in

TABLE 2

CONSUMPTION OF WAXES

EXCLUDES EXPORTS

POUNDS	VALUE	UNIT VALUE	% DISTRIBUTION POUNDS	% DISTRIBUTION VALUE
575,000,000	$36,200,000	$.063		
95,000,000	9,500,000	.100		
368,000,000	15,800,000	.043		
1,038,000,000	61,500,000	.059	93.8%	61.1%
20,400,000	$18,800,000	.92		
5,699,000	2,900,000	.51		
2,757,000	2,200,000	.80		
1,000,000	700,000	.70		
1,657,000	750,000	.45		
31,513,000	25,350,000	.80	2.9	25.1
7,500,000	2,400,000	.32		
7,000,000	2,250,000	.32		
5,500,000	1,870,000	.34		
1,000,000	750,000	.75		
21,000,000	7,270,000	.34	1.9	7.3
10,243,000	5,400,000	.53		
236,000	83,000	.35		
10,479,000	5,483,000	.52	1.0	5.4
3,900,000	970,000	.25		
108,000	60,000	.57		
4,008,000	1,030,000	.26	0.4	1.0
1,105,000,000	$100,630,000	$.09	100.0%	100.0%

* Estimates made on basis of various industry data.
(A) Does not include chlorinated paraffin, hydrogenated cottonseed oils, and large quantities of stearic acid used as a wax.

Table 4. About one billion pounds a year of petroleum waxes are used, mainly for paper containers, candles, electrical goods, textiles, polishes, chlorinated paraffin, leather goods and fruit coatings.

Vegetable waxes are consumed in large quantities only in polishes and carbon paper.

In the field of synthetic waxes, there are only three million-pound applications (where the entire industry uses at least one million pounds a year): chlorinated naphthalene for the electrical trade; terphenyl hydrocarbons for plasticizing rubber and paints; and hydrogenated castor oil for high-temperature automotive greases. Other synthetics are sold in small quantities to hundreds of consumers.

Of the animal waxes, it is estimated that four, three and one million pounds of beeswax go into cosmetics, candles and polishes, respectively.

To show how lines of distribution are set up within consuming indus-

tries, some of the main ones will be examined below. The detail in which a particular industry is discussed varies with the complexity of its marketing pattern.

Paper Products: Because the paper industry's principal products are throw-away containers and wraps, it must rely on inexpensive petroleum paraffin waxes. It uses the fully refined type, with a melting point of 127-140 F. They are available at about 6 cents a pound, and do a satisfactory job.

The quantity of paraffins consumed —760 million pounds—dwarfs the small amount—only a few million pounds—of other additive waxes and non-waxes used for special jobs. Examples of these are Vistanex (polyisobutylene), and Alcowax or Alathon (polyethylene), sometimes incorporated to improve tensile strength of bread wraps. Paper drinking cup coating formulations sometimes contain 20% carnauba and small amounts of synthetics to raise the melting point to about 170 F.

Milk containers, of course, use tremendous amounts of paraffins. (The paraffin requirements of American Can Co. alone for this use are about 90 million pounds per year; average cost of this type of wax is about 7 cents per pound.)

Much of the increase in paraffin wax production in recent years has been for frozen food containers such as waxed parchment and waxed cartons. Companies producing food containers are numbered in the hundreds.

Candles: The candle industry, while a much smaller consumer of waxes than it used to be, consumed an estimated 54 million pounds in 1951. Practically all was petroleum paraffins.

Electrical Industry: Wax usage by the electrical industry in 1951 was an estimated 30 million pounds. Of this, 20 million pounds were paraffins, and 6 million, chlorinated naphthalenes. Relatively small amounts of synthetics were used, and these were sold in small lots to a great number of electrical concerns.

Applications are in potting dopes for capacitor elements, sealing compounds, moisture-proofing treatments for containers, insulating coatings, arc-resistant coatings and in condensers.

Polishes: The polish industry uses more types of wax than any other, drawing some quantities from each class. Of the 34 million pounds consumed, about one-half is paraffin; one-quarter, carnauba; the remainder, others. The 9 million pound consumption of carnauba represents one of the primary inducements for the chemist to synthesize an acceptable and economical replacement for the natural product. To date, however, efforts have been unsuccessful.

There is a great number of consumers in this field, which embraces the main groups of floor, automotive, furniture polishes. Among the larger firms dominating the field are S. C. Johnson, American Home Products, Simonize, R. M. Hollingshead, Best Foods, Three-in-One.

Textiles, Leather: In applications similar to waxed paper containers, the textile industry consumes about 18 million pounds of wax a year, for waterproofing; the leather industry, about 12 million pounds. Practically all of it is paraffin.

Protective Coatings: Outlets for wax as protective coatings comprise paints, pigments and inks; and exterior coating of fruit and vegetables. About 12 million pounds, again principally petroleum types, go into these uses.

Carbon Paper: Making carbon paper consists of coating one side of a suitable sheet paper material with "carbon paper ink," a mixture of wax, color and oil. The three ingredients must be precisely balanced to yield the desired characteristics. Principal function of the wax is as a vehicle to carry the color and prevent the ink from soaking completely into the paper.

According to rough estimates, about 4 millions pounds of the quantities used each year is carnauba, 1 million ouricuri, with the balance divided between candelilla, sugar cane and montan waxes. Besides this, various synthetics are used in small amounts, and some cheaper waxes go into so-called "one-time" carbon papers. Foreign montan formerly had good acceptance in this field, but imports were of such poor uniformity that it has lost much of the market. More recently, American Lignite in California has produced a more uniform montan that may achieve importance in this field.

The industry, more compact than many other wax-consuming fields, is interesting from a cross-sectional standpoint. It is comprised of 50-odd companies, eight of which are large. One typical large firm (producing over $3 million worth of carbon paper per year) consumes about 250,000 pounds of carnauba per year, 40,000 pounds of ouricuri, and small amounts of montan and paraffins. The eight large companies account for 75% of the wax consumed by the carbon paper makers; the remaining 40-odd, 25%.

TABLE

U. S.

(Excludes production of synthetic,

P O U

YEAR	PETROLEUM WAXES U. S. PRODUCTION	CARNAUBA & OTHER PLANT WAXES U. S. IMPORTS
1951	1,347,920,000	24,920,975
1950	1,249,360,000	30,560,647
1949	898,240,000	29,480,183
1948	984,200,000	21,322,105
1947	1,014,720,000	23,737,388
1946	840,840,000	28,811,826
1945	817,880,000	27,118,917
1944	807,240,000	27,014,127
1943	755,160,000	31,986,079
1942	700,560,000	24,036,439
1941	670,040,000	35,650,188
1940	513,240,000	25,176,508
1939	464,520,000	23,480,594

3

WAX SUPPLY

U. S. mineral, sugar cane waxes, and imported I. G. waxes)

N D S

BEESWAX & OTHER ANIMAL WAXES			MONTAN & OTHER MINERAL WAXES	
U. S. IMPORTS	U. S. PRODUCTION	TOTAL	U. S. IMPORTS ONLY	TOTAL
5,277,970	4,500,000(E)	9,777,970	5,645,369	1,398,042,284
5,980,075	4,500,000(E)	10,480,075	2,342,940	1,292,743,662
3,985,372	4,151,000	8,136,372	1,785,434	937,641,989
4,738,527	4,044,000	8,782,527	803,991	1,015,108,623
3,575,899	4,500,000	8,075,899	322,046	1,046,855,333
6,555,761	4,381,000	10,936,761	768,826	881,357,413
7,457,595	4,543,000	12,000,595	....	856,999,512
4,241,459	3,921,000	8,162,459	....	842,416,586
4,413,748	3,743,000	8,156,748	11,987	795,314,814
5,320,442	3,344,000	8,664,442	12,798	733,273,679
6,894,124	3,495,000	10,389,124	112,187	716,191,499
5,041,008	3,960,000(E)	9,001,008	1,361,254	548,778,770
4,924,164	3,630,000(E)	8,554,164	8,010,586	504,565,344

Sources: U. S. Dept. of Commerce; U. S. Dept. of Agriculture; Bureau of Mines. E—Estimated.

The large manufacturers are: Kelox Manufacturing (Rochester, N.Y.), Royal Typewriter (East Hartford, Conn.), F. S. Webster (Cambridge, Mass.), Old Town Ribbon & Carbon Mfg. ((Brooklyn, N.Y.), Remington Rand (Bridgeport, Conn.), Columbia Ribbon & Carbon (Glen Cove, N.Y.), Carter Ink (Cambridge, Mass.), and Ault & Wiborg Div. of Interchemical (Cincinnati, O.).

In addition to these companies, there is a group which produces an equally large amount of paper of the "one-time" carbon type. Since these are for sales books and for non-machine use, expensive waxes such as carnauba can't be employed in the mix. The coatings are formulated primarily with paraffins and some synthetics. One company, however, uses about 25,000 pounds of carnauba and 5,000 pounds of ouricuri per year. Among producers in the field are Baltimore Sales Books Co. (Baltimore); Philip Hano (Holyoke, Mass.), and Port Huron Paper Co. (Port Huron, Mich.).

Other Industries: As shown in Table 3, there are a great many industries consuming the balance of the waxes, particularly synthetics. Main outlets are cosmetics, pharmaceuticals (particularly for beeswax), mold release lubricants and high-temperature automotive greases (using compositions) and chewing gum. Other miscellaneous uses are as various agents for anti-tack, anti-block, anti-static; for flattening, softening and sizing.

KINDS OF WAXES

PETROLEUM TYPES

Averaging less than a dime a pound in price, petroleum waxes are the workhorses of the industry. Although their outstanding property is resistance to liquids and vapors, these waxes vary considerably in properties, depending on the fraction of the particular crude from which they are obtained, and the process employed in their manufacture.

Improved refining techniques have made possible a wide range of grades, with many specialized uses. Such variations in properties plus ample supply at low stable prices account for their wide popularity.

Production: During the period 1939-1951, U.S. production of petroleum waxes tripled: from 464.5 million pounds in 1939 to 1,348 million (all-time high) in 1951. Twenty-eight percent—more than in 1950—of this ouput was exported; stocks increased about 40%; consumption remained the same. Much of this growth, scored in 1950, was attributable to the broad adoption of paper milk containers.

U.S. production of fully refined waxes in 1950 amounted to 660 million pounds, or 53% of the total. Crude scale wax, semi-refined paraffins and others were 476 million pounds, 38% of the total. Microcrystallines accounted for 9% of the total, or 113 million pounds.

Although decreasing in importance, the old pressing and sweating process for producing paraffins from wax distillate is still used. Most plants, however, have changed over to solvent dewaxing units. Production men speak of three types as follows: Paraffins, microcrystallines and petrolatums (or crude scale). The paraffins are generally obtained by dewaxing light lubricating oil stocks, petrolatums by dewaxing heavy lubricating oil stocks, and the micros by de-oiling and cutting the petrolatums. Melting points of paraffins are generally lower than those of the micros; the former have a greasy feel, compared with the tacky or resinous feel of micros.

The use for petrolatums is limited largely to cosmetic and pharmaceutical applications. However, they are

TABLE

ESTIMATED U. S. WAX CONSUMPTION

(MILLIONS OF POUNDS)

END USE	PETROLEUM WAXES	VEGETABLE WAXES: CARNAUBA	CANDELILLA	OURICURI	SUGAR CANE	OTHER
Paper: milk containers, food wraps, etc.	760.0	1.0				
Candles	50.0		.7			.5
Electrical	20.0					
Polishes: floor, auto, furn., shoe	15.0	8.6	2.1	1.2	.5	.8
Chlorinated paraffin	23.0					
Textiles	18.0					
Leather	10.0		.6	.2		
Prot. coatings & inks					.1	
Fruit & vegetable coatings	10.0	1.0				
Carbon paper		4.0	.2	1.2	.4	
Cosmetic, pharmaceutical						.1
Greases						
Lubricants: molds & other						
Rubber and/or Resins						.1
and/or Agents: anti-block, tack, static, flattening, softening, sizing.						
Plasticizer for rubber & pts.						
Chewing gum			.6			
Additives to other waxes						
Other	2.3	1.4	.1	.1	.4	.6
Imported	.2	16.0	4.3	2.7	1.4	1.9
U. S. Production	1,347.9					.2
Less: Exported	378.3					
Inventory Increase	61.3					
Total Used — U. S.	908.3	16.0	4.3	2.7	1.4	2.1

occasionally used as plasticizers in wax formulations.

Microcrystallines sometimes also derived from pipe still bottoms, can be divided into two classes: (1) the extremely ductile, flexible and tacky products commonly used as laminates and (2) the relatively high-melting, dry or relatively oil-free waxes of interest to the electrical and liquid polish industry. This latter type has found wide use in many fields, since in some cases the price range is comparable to paraffins.

Socony Vacuum commercialized microcrystalline waxes in about 1930; is today the largest producer. Sun Oil, Sonneborn, Gulf, and Esso Standard have well-established positions in the field. Warwick Wax and Petrolite Corp. among others oxidize the micros to make bases with emulsification and saponification properties that are valuable to no-rub floor polishes formulators.

At selling prices of 34-40 cents a pound, these are attractive replacements for, or extenders of carnauba. Their growing acceptance in the floor polish field presumably is responsible for Bareco's recent entry into oxidized micro waxes (*CW, Mar. 8, '52*).

End Uses: Requirements of the paper products field, primarily food packaging, account for over 90% of total petroleum wax sales; the candle industry is second. Miscellaneous groups such as textile waterproofing sizes, polishes, matches, electrical, rubber, leather, fruit and vegetable coattings and chemicals account for the remainder.

4

by END USE for 1951

POUNDS)

SYNTHETIC WAXES				BEESWAX & OTHER		
SPEC. SYNTHET.	CHLOR. NAPH.	HYDROG. CASTOR OIL	I. G. GROUP	ANIMAL	MINERAL	TOTAL
.5		.7			.5	762.7
				2.8		54.0
1.0	5.6	.2			2.2	29.0
1.0	.3	.5	.9	1.0	2.2	34.1
						23.0
.1						18.1
			.2		1.0	12.0
.3		.2			.1	.7
.1						11.1
.1			.1		.4	6.4
.8		.2		4.4	.4	5.9
		4.0			.5	4.5
.8						.8
.5						.6
1.0						1.0
						.6
.3	.3					.6
1.5	1.3	.2	.3	1.5	.3	10.0
			1.5	5.2	5.6	38.8
8.0	7.5	6.0		4.5	2.0	1,376.1
						378.3
						61.3
8.0	7.5	6.0	1.5	9.7	7.6	975.1

Important applications in the packaging field are for milk cartons, other dairy products such as margarine, butter and cheese, bread wrap, frozen foods, prepared dry cereals, army "C" rations, waxed cups, liquid food buckets, and other waxed papers.

Consumption of paraffin wax in milk containers has recently taken the lead over bread wraps, formerly the largest single field of use. In this application, straight paraffin or a blend of paraffin with a small percent of microcrystalline wax is used as a coating after cartons are fabricated. These concerns are said to produce over 90% of all milk cartons: American Can (New York), Purepack Div., Excello Corp. (Detroit), and Sealright Corp. (Fulton, N.Y.). These firms buy waxes directly from suppliers.

Purepack, however, makes machinery for use by the dairy industry in fabricating rectangular containers with tapered tops.

Sealright, the smallest of the three, manufactures commercial containers with metal rims. A recent development of this company which petroleum wax producers are keeping their eyes on is a vinyl resin-coated container, called Sealking. It uses no wax.

In addition, Continental Can produces containers for cottage cheese, whipped butter, etc. for the dairy products industry.

Trend to Blends: One of the newer trends in bread wrap applications is blending small percentages of polyethylene or polyethylene and microcrystalline wax with the paraffin wax. When microcrystalline wax is an in-

TABLE 5

SYNTHETIC WAXES

(EST. SALES, VALUE, UNIT VALUE FOR 1950)

SPEC. SYNTHETICS PRODUCER	EST. 1950 SALES POUNDS	VALUE	UN. VAL.	TYPE PRODUCTS
Carbide	2,500,000	$875,000	$ .35	Polyethylene glycol
Glyco	1,500,000	450,000	.30	Complex nitrogen deriv. of higher fatty acids; polyglycol stearates, and others
Armour	500,000	200,000	.40	Amides, nitriles of higher fatty acids
Monsanto			.17	Terphenyl hydrocarbons—mixed isomers
Monsanto	3,000,000	875,000	.50	Terphenyl hydrocarbons—purified isomers
Other Spec. Synth.			.30	Various
Total	7,500,000	2,400,000	.32	
Chlorinated naphthalene (50% wax substitutes)				
Halowax Div. (Carbide)	7,000,000	2,250,000	.32	Chlorinated naphthalene
Hydrogenated Castor Oils				
Archer, Daniels, Midland	over 2,000,000			
Baker Castor Oil	1,500,000			
Du Pont*	1,000,000	1,870,000	.34	Triglyceride of 12-hydroxy stearic acid
Swift				
Emery Ind.	1,000,000			
Vopcolene Div.				
Total	5,500,000	1,870,000	.34	
Imported Synthetic Wax and Rosin Prods.	1,000,000	750,000	.75	Montan wax, oxidized, esterified and/or reduced to ketones & hydrocarbons
Chlorinated Paraffin (More generally not considered waxes)				
Hooker				Chlorntd. Par. Liquid
Diamond Alkali	23,642,000	2,850,000	.12	Chlorntd. Par. Liq. & Sol.
Hercules				Chlorntd. Par. Liquid
Halowax (Carbide)				Chlorntd. Par. Liquid
Total	23,642,000	2,850,000	.12	

Note: Several million pounds of stearic acid per year are used as a wax.
* Product discontinued in mid-1952.

gredient in such blends, amounts up to 40% are used. The paper cup industry has also begun to employ such blends.

The growth of microcrystalline wax in recent years has been due to development of new uses in food packaging such as the above. Chief applications of the micros are:

1. In bread wraps, where they are mixed with paraffin to improve tack and heat-sealing properties.

2. In laminated packaging, they act as adhesives and vapor barriers in piecing paper to paper, paper to cellophane, paper to foil, etc. for greasy food packages, dry food liners, and similar uses. Consumption here for cigarette packages is large.

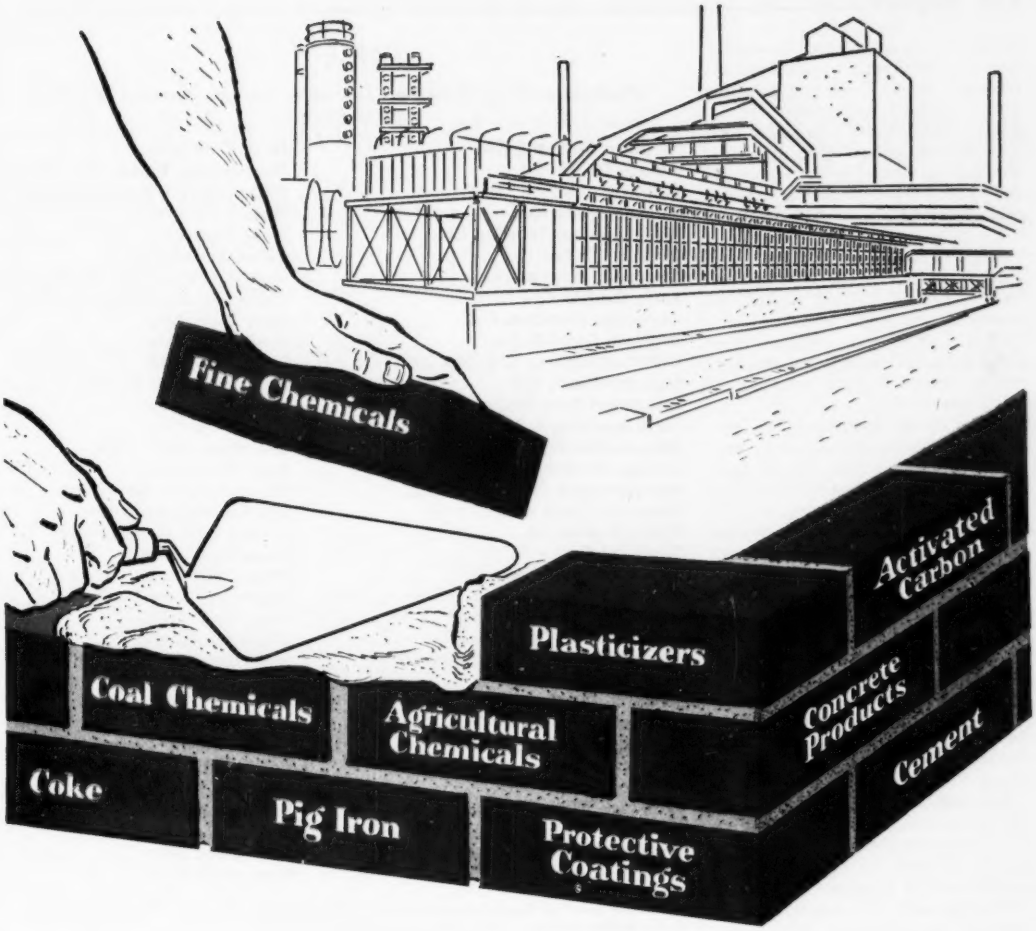
In general, markets for petroleum waxes differ from those for synthetics and natural waxes because (1) properties of petroleum types are too limited for applications where the others are established, and (2) the low cost of petroleum types keeps the others from making much headway in the volume uses. Exceptions to (1) are the polish and carbon paper fields which are limited consumers of tank bottom waxes and oxidized micros.

SYNTHETIC WAXES

The appearance of a number of synthetic waxes on the market in recent years, a development of major importance, can be attributed to the traditional ingenuity of the chemical industry. Most of these products are waxes only in the sense that they possess physical properties similar to natural waxes. The high price or commercial unavailability of starting materials has precluded broad commercial feasibility of the rather obvious duplication of natural vegetable waxes by esterification of high molecular weight acids and high molecular weight alcohols.

Many of the synthetics have gained widespread use primarily because of their highly specific and, in many cases, unique properties. However, they are also valued as replacements for higher priced natural waxes.

Of the available esters which re-



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semble waxes in physical properties, esters of polyhydric alcohols are the principal ones. Esterifying ethylene glycol or diethylene glycol, for example, with stearic acid gives high molecular weight products of a wax-like nature. Similarly, the mono, di- and tristearate of glycerine, or mixtures thereof, are widely used. And sorbitol can also be esterfied with stearic acid.

High molecular weight acids and alcohols as such have wax-like characteristics. Cetyl and stearyl alcohols are examples; the acids include stearic, palmitic and myristic. Most of these are sold as technical grade products which contain varying amounts of other components.

Some of the hydrogenated vegetable oils are considered to be true waxes and are included in this field.

Blaw-Knox has developed a plant for Ruhr Chemie, Germany, to produce molecular waxes by the oxo process. Such waxes have a melting point of 240 F and possibly higher. A pilot plant has been completed, and a commercial plant destroyed in the war is being refurbished and redesigned; the company has begun to solicit business in this country.

Estimated production of the different types by producers is given in Table 5; in Table 6 are listed producers of lesser-volume waxes and blends.

Ethylene Oxide Derivatives: Carbide has given the trade name Carbowax to its series of higher polyethylene glycols. Commercial Carbowax compounds are all mixtures of polymers of varying molecular weights and are grouped according to their mean molecular weight, as 1000, 1500, 5000 and 6000. A unique characteristic of these products is that they are readily water-soluble. Eethylene oxide can also condense with other compounds with active hydrogens, as alcohols, phenols, amines, and amides to give polymers with wax-like properties.

These synthetics selling at about 2.5 million pounds per year, are used mainly for mold lubricants, pharmaceutical ointments, cosmetic preparations and textiles. Other small uses are for paper coatings and in ceramics.

Fatty Acid Amides, Nitriles: The amides of higher fatty acids, as stearamide, are neutral chemicals of wax-like nature. They are offered by Armour and Co. under the Armid trade name in various melting points ranging in the 131-208 F range. Nitriles and amines of the higher fatty acids are also wax-like solids produced by Armour. Armourwax, a light tan, hard brittle wax (m.p. 270 F min.), is another nitrogen derivative of high molecular weight fatty acids.

TABLE 6

**** Producers of Small-Selling Synthetic Waxes, Natural Waxes and/or Blends***

William Allison & Co.	**New York City**
Alrose Chem. Co.	**Providence, Rhode Island**
Atlantic Refining Oil Co.	**Philadelphia, Pennsylvania**
Avon Trading Co.	**New York City**
Baird Rubber Trading Co.	**New York City**
Bareco Oil Co.	**Tulsa, Oklahoma**
Concord Chemical Co.	**Moorestown, New Jersey**
T. G. Cooper Co.	**Philadelphia, Pennsylvania**
Cornelius Products Co.	**New York City**
William Diehl & Co.	**New York City**
Distributing and Trading Co.	**New York City**
Esso Standard Oil	**Bayonne, New Jersey**
Industrial Raw Materials Corp.	**New York City**
Innis Speiden & Co.	**New York City**
International Wax Refining Corp.	**Brooklyn, New York**
Lenape Trading Co.	**New York City**
Mamaroneck Chemical Corp.	**Mamaroneck, New York**
Petrolite Corp. Ltd.	**Los Angeles, California**
Frank B. Ross Co.	**Jersey City, New Jersey**
Shell Oil Co.	**Houston, Texas**
Smith and Nichols	**New York City**
Socony Vacuum Oil Co.	**Brooklyn, New York**
L. Sonnenborn Sons, Inc.	**New York City**
Standard Oil Co. of Indiana	**Chicago, Illinois**
Standard Oil Co. of California	**San Francisco, California**
F. W. Steadman Co.	**New York City**
Strahl & Pitsch, Inc.	**New York City**
Strohmeyer & Arpe Co.	**New York City**
Sun Oil Co.	**Marcus Hook, Pennsylvania**
Union Oil Co.	**California**
Velsicol Corp.	**Chicago, Illinois**
Warwick Wax Co., Inc. (sub. of Sun Chem.)	**Long Island City, New York**
Wax and Rosin Products	**New York City**
Wessel, Duval & Co.	**New York City**

*** While some of these companies have large-selling lines, this list refers only to their smaller volume special waxes and blends.**

Sales of these compounds, all produced by Armour, are estimated to total about 500,000 pounds per year. They find application in polishes, records, protective coatings, carbon papers, printing inks. In addition, they function as mutual solvents for waxes and plastics, as anti-block agents in synthetic resin sheets, and as textile waterproofers, softeners and sizes.

The Acrawaxes, produced by Glyco Products Co., comprise another group of complex nitrogen derivatives of the higher fatty acids. They are hard synthetic waxes with melting points ranging from 187 F to 288 F, color varying from tan to light brown. Important applications are: anti-tack, anti-block and anti-static agents in resins and synthetic rubber; lubricants for metals, plastics and synthetic rubber; electrical sealants and insulation coatings; adhesives; flatting agents; dental waxes; electroplating "stop-off" waxes; textile coatings, asphalt blends; paints, varnishes and lacquers.

Acrawax and other Glyco waxes are sold through 10 distribution points in this country, and in most foreign countries as well. Output is believed to be approximately 1.5 million pounds per year.

Hydrogenated Oils: Hydrogenated castor, cottonseed, soybean, corn and peanut oils are wax-like products. The best known example of this type that is truly a wax is hydrogenated castor oil: chemically, triglyceride of 12-hydroxystearic acid.

Producers in order of output are Archer-Daniels-Midland Co., Baker Castor Oil, Swift, Emery Industries, and Vegetable Oil Products Co. (Vopcolene Div.). Du Pont formerly made Opalwax (the brand name given to its product) but has recently discontinued production.

Demand which appears to be growing at possibly ½ million pounds per year was estimated at 5.5 million pounds in 1950. Producers expect this figure to be doubled in a few

A useful group of resins for many types of paint, anti-rust compounds, adhesives, waterproofings, rubber compounds, cements, floor tile, textiles and many other products.

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"...softens my beard quicker."

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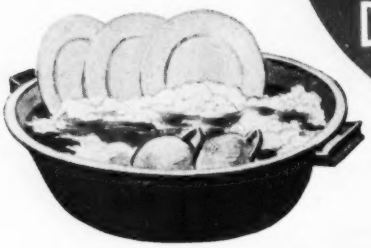

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TABLE 7

CARNAUBA WAX

YEAR	U. S. IMPORTS* QUANTITY (Lbs.)	U. S. IMPORTS* UNIT VALUE ($/Lb.)	O. P. & D. PRICES**—(bags) ($/Lb.) NORTH COUNTRY YELLOW CHALKY	No. 3 Ref'd.	No. 1
1951	16,016,279	.929	1.170	1.250	1.320
1950	20,446,294	.775	†	.785	1.035
1949	19,170,014	.713	.775	.800	1.110
1948	15,260,890	.736	.720	.725	1.270
1947	11,836,182	1.153	1.275	1.335	1.600
1946	17,708,538	1.086	1.700	1.750	1.880
1945	14,747,355	.667	.7125	.735	.8325
1944	17,510,114	.638	.7125	.735	.8325
1943	18,307,347	.596	.7125	.735	.8325
1942	14,213,570	.689	.775	.785	.880
1941	22,167,004	.586	.615	.635	.720
1940	16,925,931	.461	.490	.505	.720
1939	16,358,508	.301			

* U. S. Department of Commerce. ** Jan. 1–July 1 Average. † No stock.

years but point out that all but basic producers will find tough sledding with castor oil selling at 27¢ and its hydrogenated form at 34¢. Recent frustrating events have been a lithium shortage, a petroleum industry strike, and government stockpiling of castor oil.

In keeping with their forte of finding their special niche, this wax is said to be hanging its bright future on the excellence of lithium hydroxystearate multipurpose greases. These greases combine high temperature stability with unusual water resistance. They are produced under a basic patent held by the Foote Mineral Co., Inc. and Shell's process patent.

Two-thirds of these waxes is now said to be used in such greases. Ten percent is estimated to go into hot melt paper coatings for hardness and insolvency; 5% into shoe and floor polishes as an extender for carnauba. Some is also used in gasket compounds for gasoline resistance; in inks, electrical, pharmaceutical and cosmetic fields.

Complementing its Castorwax, Baker has developed modified forms of hydrogenated castor oil having melting point range of 50-86 C. Analogous castor oil-derived synthetic waxes are marketed under the trade name of Paricin; are mainly single and double esters of hydroxystearic acid.

Procter & Gamble, General Foods, and others fully hydrogenate cottonseed and other oils, but most of this output is used in edible products. These products, totaling 15-25 million pounds, are not considered to be waxes and are not included in this review.

Terphenyl Hydrocarbons: Monsanto's Santowaxes are synthetic terphenyl hydrocarbons supplied in two ways: as purified isomers—ortho, meta, or para-diphenyl benzene—or as mixtures of these or allied derivatives. They are marketed as O, M, P, and R. Price, unchanged for some time, is 50 cents per pound for the purified isomer; 17 cents, for the combined.

The ortho (O) type is yellow, solidifies at 140 F. It is soft after melting but will become as hard as montan wax 40 hours later. Santowax (M) is microcrystalline, will become hard as candelilla; is very stable to heat; has a melting point of 181-184 F. Santowax (P) is nearly white crystalline hydrocarbon, very stable to heat, with a very high but unstable melting point. Solidification point is 411-417 F. Santowax (R) (regular) is a yellow waxy solid with a melting point range of 140-293 F. Despite the name, Monsanto suggests that these are not waxes but are offered as wax substitutes.

Over two-thirds is used as plasticizers for resins and paint and as an extender for carnauba; the balance goes for waxing citrus fruits, for soft wax and resin compositions; and for high melting wax coatings for the paper and packaging industry.

Chlorinated Naphthalene: Halowax Products Division of Union Carbide & Carbon produces chlorinated naphthalene waxes under the Halowax trade name. They are hard, tough, pale yellow compounds with a chemical odor more or less like chlorine and possess peculiar chemical and physical properties. Standard grades are designated as No. 1001, 1003, 1014. Melting points range from 196 F to 356 F. In addition there are special grades which have been developed for specific uses. For example, although small-selling, these blends in the 2000 series are used expressly for electrical sealing applications. A total of 20-30 grades is handled on a commercial basis.

These waxes do not support combustion. They have excellent dielectric constants; are moisture repellents, chemically resistant and very stable. Their properties make them of great value in the electrical industry for flameproofing fibrous insulation and for other uses. Halowax 1001 is used primarily as an impregnant for paper-tubular capacitators.

The Barrett Division is a main supplier of napthalene for these waxes; over 5 million pounds of naphthalene are estimated to be used annually. The chloronaphthalenes are produced at Wyandotte, Mich.; output is estimated to be about 7 million pounds of wax per year despite periodic shortages of naphthalene and chlorine. These wax products are the tri-, tetra- and higher substituted chloro-

PROGRESS REPORT #3 *.n a series of pages published by Ciba to acquaint industry and the public at large with its expanding facilities for production and service.*

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When an enterprising company and the community in which it seeks to establish a new plant see eye to eye, the happy relationship that can result reflects credit upon the vision and understanding of both parties. And, as has been proven by Ciba's earlier expansion into new manufacturing environments, the results can be measured in tangible terms of long range benefits to all concerned..

In the building of Ciba's new vat color plant now nearing completion at Toms River, New Jersey . . . the most modern plant of its kind . . . the company has succeeded once again in not only developing a most desirable plant site for greatly expanding its production facilities and related customer services, but also in becoming a good neighbor rather than a strange bedfellow to the community.

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TABLE 8

CANDELILLA WAX

YEAR	U. S. IMPORTS* QUANTITY (Lbs.)	UNIT VALUE ($/Lb.)	O. P. D. PRICES** (bags) ($/Lb.) CRUDE	REFINED
1951	4,307,867	.641	.710	.755
1950	5,699,177	.426	.470	.505
1949	7,113,788	.380	.545	.580
1948	2,593,380	.346	.615	.650
1947	8,424,381	.316	.725	.745
1946	7,093,554	.564	.790	.850
1945	9,606,367	.313	.363	.440
1944	6,711,191	.275	.363	.440
1943	10,880,032	.283	.380	.440
1942	7,745,790	.193	.355	....
1941	7,946,882	.160	.208	....
1940	5,644,136	.136	.185	....
1939	3,357,066	.125	.170	....

* U. S. Department of Commerce. ** Jan. 1–July 1 Average.

naphthalenes. Also produced is monochloronaphthalene. This, a liquid nonwax, is used as an oil additive for gum solvency in upper lube oils.

Chlorinated Paraffins: Chlorinated paraffins may be liquid, semi-fluid or solid depending on the type of paraffin and the degree of chlorination. Chlorine content of various commercial grades is in the 30-70% range, with solids containing about 70% (price 18¢ per pound), the liquids and semi-fluids 40-50% at 13½¢ per pound. Although usually included in wax surveys, chlorinated paraffins are liquids and brittle, pulverizable resins that are not waxes, and are not represented in overall statistics in this report. About 90% of all sold is the so-called 40% grade, the 70% grade accounting for the balance.

All of the chlorinated paraffins have highly desirable fire-retardant, water- and mildew-resistant properties. They may also be employed as plasticizers. Chief application of the liquid and semi-fluid products is treating fabrics such as military tenting, canvas, camouflage materials, clothing, etc. Other important uses: low-cost vinyl plasticizer; component in chlorinated rubber-base paints and coatings; electrical insulation; wire drawing lubricant, and cutting oils.

Solid chloro-paraffins go into many of the same outlets as liquids; are also used in exterior and interior fire-retardant paints, adhesives, printing inks, flame-resistant linoleum and deck coverings.

Demand for these products, while relatively stable during normal times, has risen because of defense requirements for flame- and water-proofing. Output was similarly affected during World War II, hit 43-60 million pounds, then ran at about 17 million since, but expanded to 23 million in 1950.

Producers of the liquids and semi-fluids are Hercules, Diamond Alkali, Hooker, and Halowax Products. Solid grades are made by Diamond (Chlorowax 70).

Pentowaxes: These products, formerly produced by Heyden Chemical, have been discontinued. They were modified fatty acid esters of pentaerythritol and its polymers. Principal applications were limited to use as mold release lubricants for urea-formaldehyde plastics and in polishes.

Miscellaneous Synthetics: High molecular weight ketones as palmitone and stearone are wax-like in nature, but at present are not produced commercially in the U. S. Stearic acid itself is used as a wax in many applications, estimated to total several million pounds a year.

The Gersthofen (formerly I.G.) waxes have again appeared on the American market. Crude deresinified montan wax is oxidized vigorously to produce Wax S, which is esterified with various alcohols or reduced to ketones and hydrocarbons. An entire series of waxes is available. All processing is done on the other side of the Atlantic. In general, the various grades are used as components of wax blends to impart special properties to them.

Principal waxes sold in the U.S. at present are: OP, KPS, KP, E, S, L, CR and special. OP is the butylene glycol ester of S saponified with calcium hydroxide; KPS is an oxidized mixture of deresinified and raw montan, esterified with a mixture of ethylene and butylene glycol; KP is oxidized crude montan esterified with a mixture of ethylene and butylene glycol; E is the ethylene glycol ester of S; L is similar to S but made by a milder oxidation process; CR is the butylene glycol ester of a mixture of S and raw montan; special is the butylene gycol ester of a mixture of raw montan wax and G saponified with calcium hydroxide.

These waxes are imported by Wax and Rosin Products, and sold by that concern and also by George H. Lincks, Inc. Approximately a million pounds are being consumed, with prices ranging from 54 cents to 85 cents. They are used principally in liquid and paste shoe polish, no-rub floor polish, in leather dressings and in carbon paper.

A new synthetic wax which holds promise for the future is the Semet-Solvay Division's polyethylene-derived Alcowax. This will be produced in quantity in the company's new petrochemical plant in Tonawanda, N.Y. Alcowax is expected to have broad applications due to its outstanding polishing qualities, and will also be

Over 80 years ago, John Herman Pine first recognized, through self-treatment of a throat irritation, the demulcent . . . emollient . . . and hygroscopic properties of U.S.P. Glycerine. Today, Glycerine and Pine Bros. are virtually synonymous to a large segment of the general public . . . and consumer interest and acceptance is steadily increasing, as reflected in years of continuous sales increases.

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U.S.P. Glycerine, as a solvent and extractant for base flavors, is widely favored by extract manufacturers. It adds smoothness to mixtures . . . and distributes flavors uniformly. Even in the field of packaging materials, Glycerine has come to be an important component of wraps that come in contact with food products.

So it is today with dozens of familiar food brands . . . U.S.P. Glycerine often performs two or more functions—preserving freshness or making food products more palatable. In every instance, Glycerine is used with absolute confidence, since *it is actually a wholesome nutrient for food use!* "Why Glycerine for Foods?" tells the story of these many applications . . . why not write for a copy?

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used as an additive to other waxes to impart properties of hardness and gloss.

PLANT WAXES

Plant waxes occur mainly as coatings on plant leaves and stems and on certain berries and grasses, with some of the rarer waxes appearing on flowers, roots and fruit. Plants producing greatest amount of wax for their weight are found mainly in hot or tropical climates in arid regions; the wax acts as a coating to impede moisture evaporation.

Carnauba: Most important wax in the plant group is carnauba, obtained in the semi-arid northeastern part of Brazil where native laborers recover it from the leaves of the carnauba palm by semi-crude methods. About 75% of carnauba is the ester myricyl cerotate. Despite much work, there is no completely successful substitute for carnauba, as the ester itself cannot be synthesized economically, and other suggested compounds lack its unique combination of properties: high melting point, hardness, ability to take high and lasting polish, and compatibility in mixtures.

High prices for carnauba tend to hold an umbrella over the chemist's efforts to duplicate the product synthetically. Users of versatile carnauba in the U.S. claim that high prices have mothered declining U.S. imports and Brazil's 9,000,000 pound surplus; moreover that "European demand" represents U.S. purchases in soft currency. Brazilian authorities state that present price levels are necessary to northern Brazil's economic welfare and to allow for growing European demand. Some price shading is said to go on through evasion by so-called "marmalade deals".

The two main uses for carnauba wax are in water emulsion floor polishes and carbon paper, each use consuming about 35% of available supplies in the U.S. Shoe, automobile and other polishes also use considerable quantities. A miscellany of other outlets includes phonograph records, insulating materials, electric batteries, candles, matches, soaps, salves and chalk. It is often used in mixtures of waxes as a melting point booster. (Table 7 gives a 13-year trend in imports and prices.)

Candelilla: A hard and brittle wax found in the dry regions of nothern Mexico and southern Texas, candelilla is composed of about 50% hydrocarbons with smaller amounts of esters and free acids. Shoe and furniture polishes are believed to consume half of its production with other uses accounting for the balance.

Principal use is in manufacture of carbon paper, floor, furniture and automobile polishes and packaged shoe stains and polishes; but it is also used in chewing gum, leather dressing, candles, cements, varnishes, sealing wax, electrical insulating compositions, phonograph records, paper size, celluloid, water-proofing and insect-proofing containers, paint remover, and as blending and hardening agent in wax mixtures. (Table 8 gives trend of imports and prices.)

Ouricuri: Ouricuri is a wax somewhat similar to carnauba but cheaper in price. It is recovered in the State of Bahia by crude methods—scraping from the leaf by knife, melting and straining.

Uses are similar to those for carnauba, for which it is often substituted, although its higher resin content makes it less desirable. According to a Department of Commerce estimate, 44% goes into carbon paper, 35% into floor, furniture and auto polishes, 12% into packaged shoe polishes, and 9% into miscellaneous uses. (Table 9 gives trends for imports and prices.)

Fir Bark Wax: A development growing out of work on the saccharification of Douglas fir waste wood to produce ethanol is a relatively new wax, fir bark wax. Oregon Wood Chemical Co., Springfield, Ore., plans to turn out 1.5 million pounds per year by steam distilling benzene used to dissolve the wax from the bark.

Esparto: Esparto wax is derived from esparto grass, a tough grass found principally in North Africa. Production is said to be about 500,000 pounds a year, of which most is consumed in Britain.

Palm: This is an interesting, but relatively unknown wax obtained from the palms of the Colombian Andes. It is high-melting, one of the hardest natural waxes.

Raffia wax, recovered from the Madagascar sago palm, is another wax in the palm group.

Sugar Cane Wax: Sugar cane wax is a by-product of sugar production. Hence it has considerable potential importance, for the magnitude and permanence of sugar cane operations should provide unique advantages in terms of quantity, stability of supply and cost considerations.

The yearly potential production of hard wax from the sugar mills of Cuba alone would be about 60 million pounds; this is more than the world's combined production of carnauba, ouricuri and candelilla.

Chemically the wax is more complex (66% esters, 27% free acids, 5% free alcohols and 2% hydrocarbons) than other hard commercial waxes. Moreover, it is claimed that the characteristics of the final product may be varied depending on the initial recovery process and the final refining or treatment operation.

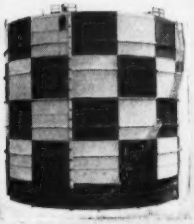
Experimental facilities with a capacity of 550,000 pounds per year were installed at a Cuban-American Sugar plant in Cuba, in 1942. In 1947 these were expanded to recover 1 million pounds of the crude wax, and again increased to about 2.5 million in 1952.

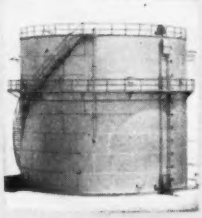
Refined wax is produced in a Gram-

TABLE 9
OURICURI WAX

YEAR	U. S. IMPORTS* QUANTITY (Lbs.)	U. S. IMPORTS* UNIT VALUE ($/Lb.)	O.P.D. PRICES** (bags) REFINED ($/Lb.)
1951	2,651,813	.670	.925
1950	2,757,290	.645	.775
1949	2,370,068	.592	.785
1948	2,956,468	.565	.705
1947	2,879,963	.540	.790
1946	3,539,626	.828	1.200
1945	2,454,333	.457	.563
1944	2,654,134	.445	.620
1943	2,798,072	.425	.620
1942	864,446	.562	.550

* U. S. Department of Commerce ** Jan. 1–July 1 Average.

users of chemical process  and industrial gases

get rid of  weather-worries and operating costs

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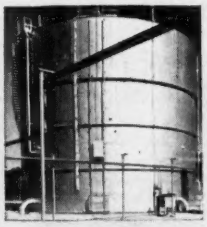

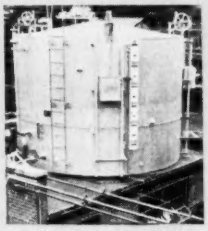

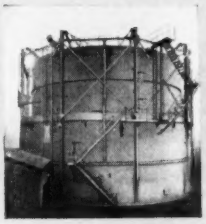

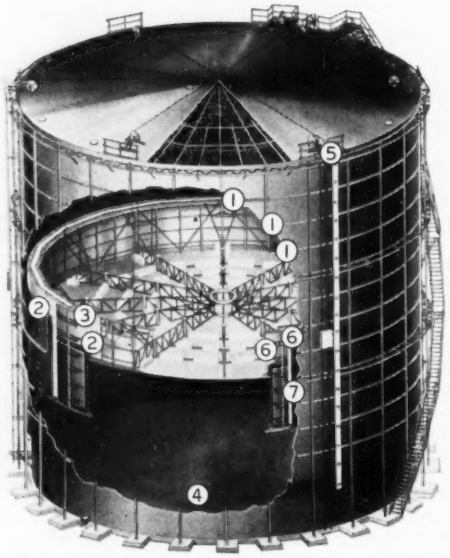

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TABLE 10

BEESWAX

YEAR	U. S. PROD.—CRUDE* QUANTITY (Lb.)	AV. PRICE ($/Lb.)	U. S. IMPORTS* QUANTITY (Lbs.)	UN. VAL. ($/Lb.)	U. S. TOTAL SUPPLY (Lbs.)	O.P.D. PRICES*** REF. YELLOW (slabs) ($/Lb.)
1951	4,500,000(E)	....	5,066,083	.606	9,566,083(E)	.690
1950	4,500,000(E)	....	5,743,821	.440	10,243,821(E)	.525
1949	4,151,000	.384	3,912,162	.443	8,063,162	.580
1948	4,044,000	.417	4,636,632	.495	8,680,632	.600
1947	4,500,000	.456	3,458,938	.486	7,958,938	.590
1946	4,381,000	.443	6,395,173	.458	10,776,173	.568
1945	4,543,000	.416	7,398,000	.373	11,941,000	.525
1944	3,921,000	.415	4,241,459	.378	8,162,459	.548
1943	3,743,000	.415	4,409,379	.358	8,152,379	.525
1942	3,344,000	.408	5,281,963	.396	8,625,963	.550
1941	3,495,000	.272	6,750,643	.304	10,245,643	.370
1940	3,960,000(E)	.210	4,750,528	.224	8,710,528(E)	.300
1939	3,630,000(E)	.180	4,674,729	.194	8,304,729(E)	....

(E) Estimate. * U. S. Department of Agriculture. ** U. S. Department of Commerce. *** Jan.1–July 1 averages.

ercy, La., plant owned jointly by S. C. Johnson and Cuban-American Sugar Co.; Warwick Wax Co. (division of Sun Chemical) is sales agency for the wax.

Demand is said to periodically exceed supply; recent price is about 85¢ per pound in carloads compared to 70¢ a year ago.

Potential uses for the wax are in water-emulsion polishes, carbon paper, and paste polishes; as pigment dispersers and for castings. Uses are also being sought for the resin and oil fractions obtained as by-products from the solvent extraction.

Myrtle Wax: Principal sources of myrtle wax, derived from the fruit or berries of several species of Myrica shrubs, are Colombia, Mexico, South Africa and the United States. Most American myrtle wax, usually referred to as bayberry wax, is collected in New England. Main use in South Africa and America is in manufacture of festive, high-grade candles and tapers. Current domestic price is 45¢ per pound.

Japan Wax: This material, resembling a fat rather than a wax, is obtained from a small cultivated sumac-like tree grown in Japan and China. It melts at about 50 C, is used in candles, rubber vulcanization, polishes and textile finishes. Usage (about 143,000 pounds in 1950) may grow modestly but is nowhere near the high prewar levels of 2.5-3.5 million pounds a year.

ANIMAL & INSECT WAXES

Beeswax, most important insect wax, is produced and distributed throughout the world. Principal constituent is myricyl palmitate, although it contains substantial amounts of free acids and hydrocarbons. Melting point is 144-149 F.

The United States imports much of its beeswax from Benzuella, W. Africa, and from Brazil, Chile, the Caribbean countries and other Latin American sources. Domestic producers, too, supply a substantial portion of our beeswax requirements.

The Department of Commerce estimated world production at 40 million pounds in 1947. In 1951, U.S. usage was 9.6 million pounds. Aside from imports, this was mainly produced in the West and consumed in the Pittsburgh, Pa., area. (Table 10 gives U.S. production, imports and prices.)

Because of its relative cheapness and plasticity, main use of beeswax is in cosmetic preparations. New largest use is in church candles. Other applications include polishes, modeling and pattern making.

Spermaceti Wax: Spermaceti wax, essentially cetyl palmitate, is obtained from the head of sperm whales, where it is dissolved in the sperm oil. A special wax of small importance (about 50,000 pounds imported in 1950; price about 30¢), it is used in candles, medicine and as a source of cetyl alcohol.

Chinese Insect Wax: Use of this imported wax in the U.S. is small, of minor importance. Outlets are in candles, furniture polishes and coatings for paper and cloth.

Shellac Wax: A by-product of spirit shellac preparation, shellac wax has a melting point of 180 F, high for the insect wax group. Shellac is deposited by the lac insect, is dewaxed by a solvent treatment to produce the wax which is used as a component of insulating material.

Wool Fat: Another by-product is wool fat, obtained in wool purification. This purified fat of sheep's wool consists mainly of fatty acid esters of cholesterol and other fatty alcohols, may be considered chemically a wax, though its properties cause it to be considered commercially a fat. It has many small uses.

Other Varieties: Other kinds of animal waxes are found in varying amounts but individually they are of small commercial importance. U. S. imports of animal waxes other than beeswax and spermaceti totaled only about 184,000 pounds in 1950.

EARTH & MINERAL WAXES

Montan wax is a bituminous wax, not a paraffin, which occurs in woody coals or lignite, and is leached out by solvent extraction. The crude wax is brown or black in color, but in the refined state it is light yellow or nearly white.

Principal source is Germany, where its manufacture is an old industry. In 1939, more than 7 million pounds

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were imported from that country. This volume interrupted by the war, was gradually rebuilt to about the 5.6 million pound level in 1951. It sells in the 12-16¢/lb. price range. The oldest importer with 30 years standing is said to be the Strohmeyer & Arpe Co. which imports the German Riebeck montans.

The 150% increase in crude montan by all importers in 1951 was partly due to barter agreements wherein partial payment for exported goods was made in wax. Such stocks, like those of many another imported chemical, may spell trouble for domestic producers.

The I.G. waxes (now called Gersthofen) are the I. G. Farben Co.'s chemical modifications of montan which are widely used in place of vegetable waxes. These are included here in with the synthetic wax group due to their extensive processing.

The Bureau of Mines has investigated production of montan wax from domestic lignitic coals, and reported that certain Arkansas and California deposits gave yields similar to the German coals, but the wax has a higher resin content. A solvent extraction similar to German processes was used. The Bureau claims that domestic sources could be exploited to supply tremendous amounts of high-grade montan, and during the war American Dyewood operated a wax-lignite plant in Arkansas.

In early 1949, domestic production was revived by American Lignite Products which is working lignite deposits at Ione, Calif. The process is based on German procedures and the earlier Arkansas project.

A more recent entry into the domestic montan wax field is Humacid Co. (*CW, April 12*), operating on the same bed of lignitic coal as American Lignite. Humacid's capacity is 30 tons of lignite per 24-hr. day; American Lignite's, 20. Combined capacity could enable this country to produce more than it imports.

American Lignite has been planning a production rate of 400,000 pounds a year of bleached (chromate oxidation) wax called Altco; this possibly means future domestic production of waxes similar to the I.G.'s.

Humacid, too, says it can make bleached montans, comparable to I.G. type S and useful as carnauba replacements, at competitive prices through a special technique permitting recovery of 80% of the chromic acid used as bleach, and a reduction in bleaching costs of about 20¢ a pound over other methods. Its products are being test-marketed at this stage. The company hopes to be in full production this year.

Commercial montan is a high-melting, hard, brittle wax used as an ingredient in polishes, electrical insulating compositions, leather dressings, inks, carbon papers, and greases. Humacid, for example, gives this breakdown of its products' current end uses: About 50% of unbleached production goes to carbon paper; the other 50% into emulsions and coatings, primarily for paper impregnation and electrical insulation. All of its bleached wax goes into floor coatings at present.

Ozokerite: The earth waxes, often referred to as ozokerites, are naturally occurring mineral waxes consisting of an aliphatic series of straight chain and branch-chained hydrocarbons with some oxygenated resinous bodies.

Ozokerite is mined mostly in eastern Europe from veins of wax shale that usually occur close to the surface of the earth. U. S. imports are of minor importance and declining.

Some mining of domestic ozokerites has been carried out in Utah and Texas. Utah ozokerite is also known as American mineral wax, or more specifically Utah wax. Ozokerite Mining Co. of Grand Rapids, Mich., has worked on Utah mineral wax ore which melts at about 200 F; this is acid-bleached to yield uniform gradings for the market. Grades offered are black, light yellow and white with melting points ranging from 171 to 190 F. However, this concern recently reported to the Bureau of Mines that it was carrying out experimental work only and had no production to report.

Ozokerite greatly resembles paraffin wax in appearance and composition, and is therefore relatively easy to adulterate with cheaper paraffin. Ozokerite owes its wide use to its great compatibility with many substances and its affinity for oil. In this respect it is superior to paraffin wax which tends to crystallize from admixture and in so doing allows fluid components present in the mixture to "sweat out."

It is used in solvent-types polishes, electrical insulator compositions, paper and leather impregnators, and cosmetics. In the trade—to the confusion of everyone—refined ozokerite, mixtures of paraffin wax and beeswax, and mixtures of ozokerites and paraffin are all often termed ceresin.

Imports of ozokerite, ceresin and other mineral waxes except montan were over 800,000 pounds in 1939 (price 17.4¢), but were cut off during the war. In 1951, 80,000 pounds were imported; price was 69¢ per pound.

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30	.0002"	60 days	3 days	6 months
50	.0035"	—	15 days	12 months

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CW Report

WAX BLENDS

Innumerable mixtures of waxes are possible; and many are of growing commercial significance. Compositions added to a wax are of two general types: other waxes, generally cheaper ones, which do not detract significantly from desired properties; and non-waxes such as resins, cellulose derivatives, etc. to produce blends with properties for specific uses.

Blends of Waxes: Of such mixtures, the most important class is blends of natural waxes with cheaper paraffins, often referred to as ceresins or ceresines. Base of these waxes is a refined paraffin to which is added carnauba, candelilla, ouricuri or montan wax as a hardening agent and melting point booster, and beeswax, ozokerite or microcrystalline wax as a decrystallizing wax.

Synthetic waxes are occasionally blended with natural wax to boost the melting point; Acrawax C may be so used, for example.

Non-Wax Additives: Additions of resins to waxes is on the rise too. It has been known for some time that natural resins as Damars, Copals, rosin, etc. can be blended with natural plant waxes to give cheaper, and for many uses, superior materials. Now synthetic resins are used in increasing amounts for this purpose.

An example of such blends is a 10% Durez 219 resin-90% carnauba mixture which is said to give a harder, glossier water emulsion polish. Blends with much higher resin content are also used, particularly in lower-cost emulsion polishes. Other synthetic resins which may be added to natural waxes include Shanco (Shanco Plastics and Chemical Co.), Lewisol (Hercules Powder Co.); also coumarone-indene resins such as branded Cumar (Barrett Division).

One of the newer and more important developments has been the adoption of paraffin, micro and polyethylene blends. Bakelite's DYGT and Du Pont's Alathon are polyethylene resins whose lighter molecular grades are used as additives. Such blends are said to have improved tensile strength, toughness, gloss, sealing strength and blocking resistance. Addition of a small amount of petroleum wax to a commercial compound may serve to improve its water vapor resistance markedly.

In addition to legitimate blends, there is a certain amount of adulteration practised by adding any of the above relatively inexpensive materials to more expensive waxes such as carnauba.

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RESEARCH . . . .

Tax Hassle Heats Up

A new ruling by the Bureau of Internal Revenue cancels tax immunity of non-profit research organizations on income from all but fundamental research contracts.

Commercial consulting and testing laboratories have the most to gain from the new regulation.

But it's odds-on that it won't go unchallenged; universities and institutes are expected to wage a legal battle.

The very mention of the word "tax" these days can be counted on to bring a chill to the heart of even the sturdiest industrial manager. But, strange as it seems, with its most recent ruling, Bureau of Internal Revenue has befriended at least one segment of industrial society—the several hundred commercial consulting, research and testing laboratories.

After several years of study, the Bureau brought out a new regulation (*CW, Sept. 20*) which, for the first time, defines research and its status under the tax laws. One major consequence of the ruling will be taxation of independent research organizations (universities, foundations, institutes, etc.). The new regulation is retroactive to cover 1951.

As is so often the case, there are several "ifs" in the new ruling. If, for example, an organization is primarily concerned with fundamental research, BIR won't press a claim. But it must qualify under the Bureau's definition of fundamental research: research not primarily intended for industrial application. Research, per se, is similarly defined in the negative. Ruled out, in the Bureau's mind, are routine activities incident to industrial operation; quality control, ordinary testing, inspection of plant equipment, etc. fall into this classification.

Thus, for all practical purposes, the non-profit institutes can no longer claim tax exemption on revenue from commercial testing and sponsored applied research.

The Gripe: This turn of events really adds up to a tacit endorsement of the commercial consulting laboratories' long-standing charge that it's not fair to exempt non-profit institutions on income from commercial work. The commercial labs' reason: The non-profit institutions were able to plow the income from this work back into their organizations to compete on a tax-free basis.

The commercial laboratories made their accusation of unfair competition immediately after World War II. In a report to the President's Scientific Research Board on the place of the commercial laboratories in the nation's economy, the American Council of Commercial Laboratories—which considers itself spokesman for the country's approximately 300 commercial labs—took the stand that the research findings of tax-free institutions should rightly be in the public domain, not for exclusive use of private firms.

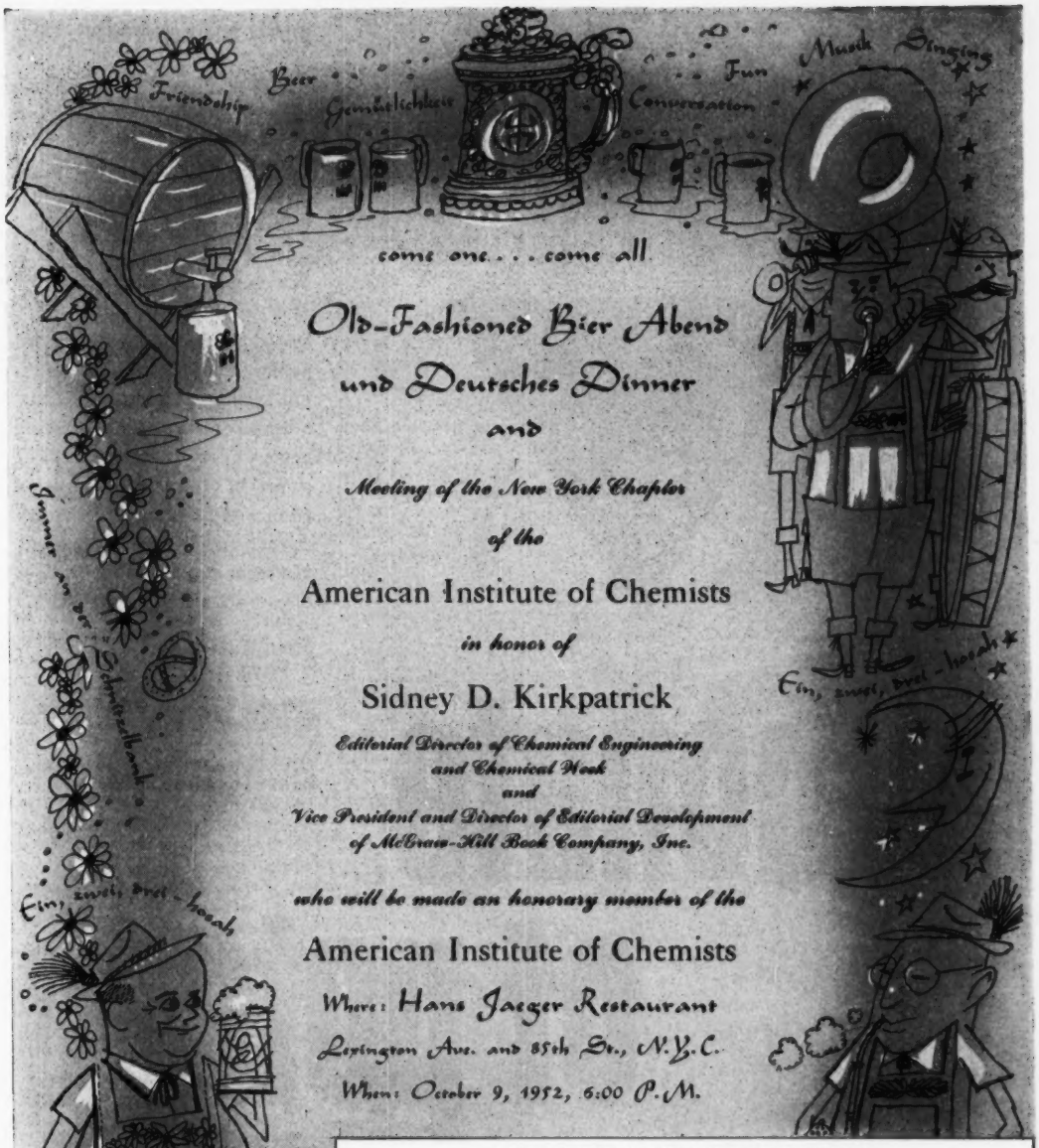
In support of this contention, the Council argues that indirectly, through tax exemption, the public pays part of the cost of such research, should benefit from it. Council spokesmen, like executive secretary Harold Dudley, take no issue with tax exemption for institutions engaged in fundamental research. And they are also in favor of continuing tax exemptions on income derived from government-sponsored research.

Fruitful Probe: From 1947 to 1950, the Joint Committee on Internal Revenue conducted an investigation of the commercial activities of universities and scientific non-profit institutions. The fruit of these labors was Title III of the Revenue Act of 1950 which carried a number of provisions designed to tax or restrain those activities of non-profit organizations that are competitive with private enterprise.

Passed in Congress with little debate, this legislation—in effect—asserted the principle of federal taxation of colleges and universities for the first time. Yet it specifically excluded from taxation income derived from academic research on the grounds that such income was related to the pursuance of educational objectives. Only educationally-unrelated revenue producing ventures, (e.g., the spaghetti factory owned by New York University) were made liable to taxation.

Given this encouragement to broaden its taxation prerogatives, Internal Revenue last January proposed the regulation to plug the research loophole; it went on the books Sept. 3.

The commercial laboratories who are behind the new ruling are a



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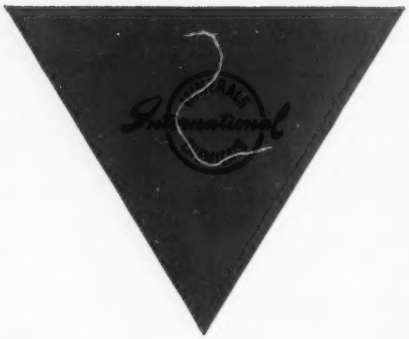

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heterogeneous lot. From the largest (Pittsburgh Testing Laboratory with a staff of 600 and a gross annual volume of about $3 million) to the smallest (which employs four people), their roster is generously sprinkled with names—Foster D. Snell, U.S. Testing, Frederick S. Bacon, California Testing, Bjorksten, Arthur D. Little, and many others—long familiar to the chemical and process industries.

Their clients fall into two broad categories: companies which lack their own laboratory facilities, depend on the commercial laboratories for product development and testing; and firms, even large ones, which do have labs but often need a disinterested scientific party for one reason or another. Individual fees vary from $5 to $100,000 and more.

Fireworks Coming: Business today is generally good. But it wasn't always, and the chances are it won't stay that way indefinitely. That's why the commercial labs are so pleased with the new tax ruling. Yet they don't believe their battle is won. On the contrary, the prevalent feeling is that the real fireworks will start when lawyers for the universities and nonprofit scientific institutions challenge Internal Revenue's action.

On one point, however, both parties to the dispute are in agreement: that research of all kinds, by everyone qualified, should be encouraged and abetted. But the commercial laboratories' claim, that no one is entitled to special treatment in tax matters at the expense of private enterprise, is a hard one to find fault with.

Good for Blondes

Toughness, flame resistance and weatherability is the triple boast of a new wood lacquer fresh out of the laboratories of Tennessee Eastman Co., Kingsport, Tenn.

Exact composition of the promising new material has not been revealed. But this much is known: It's a cellulose acetate-butyrate formulation containing Tennessee Eastman's ester EAB-381.

A thick, glossy film of the lacquer may be applied to wooden articles by dipping. It may also be brushed or sprayed on, air-dries quickly to a tough, flexibile film with little tendency to discolor in sunlight. And the extreme clarity of the resulting finish is highly desirable for blonde furniture woods.

Other probable applications for the new lacquer are in finishes for floors, venetian blinds, porch furniture, bowling pins, tool handles, etc. Its low flammability obviously will be a strong sales point for many of its suggested uses.

Whatever commercial success the new formulation may enjoy in its outdoor applications will be due largely to the workings of EAB-381. According to Tennessee Eastman chemist Fred Ball, the ester is the key to the lacquer's resistance to cracking and discoloration upon exposure to the elements.

•

Job for Infra-Red: A new use for infra-red spectrophotometry appears to be shaping up in the work of H. J. R. Stevenson and O. E. A. Bolduan at U.S. Army Chemical Corps laboratories (Camp Detrick, Md.). Their results point up the value of infra-red spectra in the identification of species of bacteria and even, in some cases, a particular strain. The next step will be the cataloging of spectra of organisms cultured under controlled conditions.

•

Red Man's Legacy: Soil from an old Wisconsin Indian burial mound has yielded a new antibiotic-producing mold. Isolated by researchers of Lederle Laboratories (Div. of American Cyanamid Co.), the chalk-white mold produces an antibiotic active against the causative agent of African sleeping sickness. The new antibiotic is called Achromycin, has given hopeful results in laboratory trials.

•

Colder for Japan: Asia's first helium liquefier was recently installed by Arthur D. Little, Inc., producer of the apparatus. The unit, an ADL Collins Helium Cryostat, was bought by University of Tohuku's (Japan) metals research institute.

•

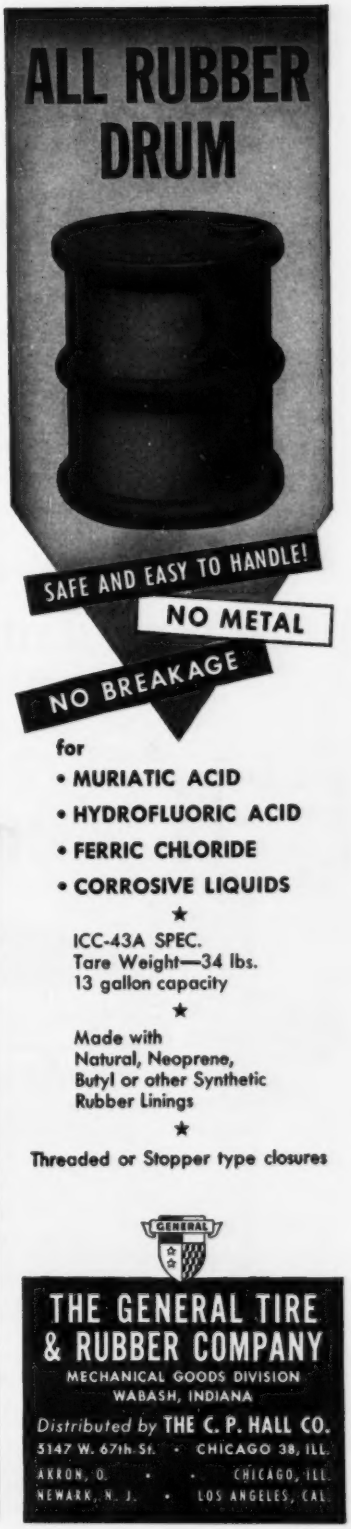
Vinyl Aid: Epoxy fatty acid esters are reported by chemist Frank Greenspan, of Buffalo Electrochemical Co., Inc., to be a new class of vinyl plasticizers with intrinsic heat and light-stabilizing activity.

•

Silicone Possibility: Increased availability of many organosilicon compounds is a possibility raised by the recent work of General Electric researchers C. A. Burkhard and D. T. Hurd on the preparation of these materials by the Oxo synthesis. By reacting alkenyl silanes with carbon monoxide and hydrogen, the GE team obtained silicon-containing aldehydes and a considerable number of high-molecular-weight silicones.

•

New Hydrazine Prep: University of Utah chemists Zwolinski, Andersen



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RESEARCH. . . . . .

and Parlin report a synthesis of hydrazine from ammonia by the use of a high-frequency electric current.

According to Zwolinski, high flow rates of gas through the discharge tube, small discharge currents, low pressures and small electrode gap distances are the keys to high yields per unit of electrical energy. Maximum yields were from four to six grams of hydrazine per kilowatt-hour of energy dissipated in the discharge tube.

•

Fluorides on the Spot: A new photometric test for fluorides, to simplify spot-checking of fluoridated water supplies, has been developed by Cornell University researchers M. L. Nichols and Albert Condo, Jr. Their results have not yet been thoroughly evaluated, but—in essence—their method is based on the change of color of iron-containing solutions of resacetophenone or 5-phenylsalicylic acid. In contact with fluorides, the former goes from deep red to colorless; the latter from purple to colorless. At this stage, resacetophenone appears better suited for the job. Both reagents, however, are inexpensive and stable for relatively long periods of time.

•

Handy Exchange: Determination of morphine in morphine-codeine mixtures is simplified by an ion-exchange separation. The procedure, which makes use of a strongly basic quaternary amine-type anion exchanger, was worked out by Eli Lilly & Co.'s Ernest Grant. The morphine base, because of its phenolic structure, exchanges with the resin while the codeine does not. Codeine is removed from the resin column by elution with solvent. Morphine is then quantitatively released by dilute acid, determined spectrophotometrically.

•

Attack on Sulfur: Vanadium oxide is the secret of a new method of upgrading gasoline stocks proposed by researchers Komarewsky, Bragg and Knaggs of Illinois Institute of Technology. Here's how it works: A mixture of crude gasoline vapors and hydrogen is passed over a heated vanadium oxide catalyst. Undesirable sulfur compounds are converted to easily removable hydrogen sulfide.

•

Phophorous Duo: Victor Chemical Co. (Chicago) is now offering research quantities of benzenephosphonic acid and benzenephosphinic acid. The phosphonic acid is a good antioxidant, can be used to improve film properties of cured polysiloxane resins. It also has possibilities as an accelerator for organic peroxide catalysts.

A continued story by one of America's oldest glass manufacturers . . .

The Case of the Acid Carboy

by GAYNER

CHAPTER SEVEN

A product is known by the company it keeps—and by the craftsmanship and quality built into it by long-established "know-how". Glass carboys are no exception to this rule—and we want you to know Dave Counsellor, master glass blower, who has no doubt turned out more Gayner carboys in the past 40 years than anyone else in the business.

Dave is proud of his work—and so are we—for the records show that nearly every major chemical industry in the country uses Gayner glass carboys to transport, store and protect their acids and other corrosive liquids. And other process industries—from fruit juices to hair tonics, pharmaceuticals to beverages and fine chemicals—have long ago discovered the many advantages of packaging in Gayner's 13-gallon MCA standard carboy:

- - quality, strength and durability of both the glass carboy and its seasoned wood case.
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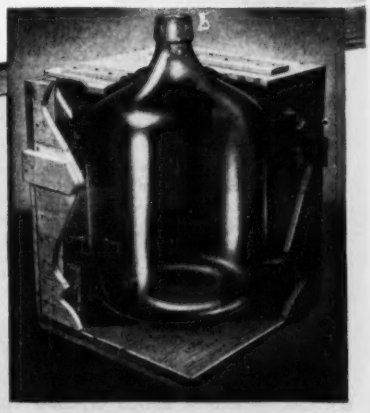

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SAN FRANCISCO PORTLAND SEATTLE

STANDARDS CONFAB:* Close to their hearts and purse strings.

Standard Practice

In the softly lit, air-conditioned confines of Chicago's "Little Theater" (of the Museum of Science and Industry) last fortnight, 60 buyers and sellers of process equipment gathered to discuss a subject close to their hearts and purse strings: the chemical industry's approach to procurement standards. The theme: economies that can accrue from a more widespread use.

Monsanto's W. T. Nichols, moderator of the program which was sponsored by the CICC (Chemical Industry Correlating Committee) of the American Standards Association, started things off by pointing out that while the chemical industry has some standards, most of them are "internal," are not applicable to "outside" procurement. Nichols added that suppliers can frequently pare their expenses by decreasing the range of products they make; improved standards thus mean a bigger profit for the manufacturer, a cheaper product for his customer.

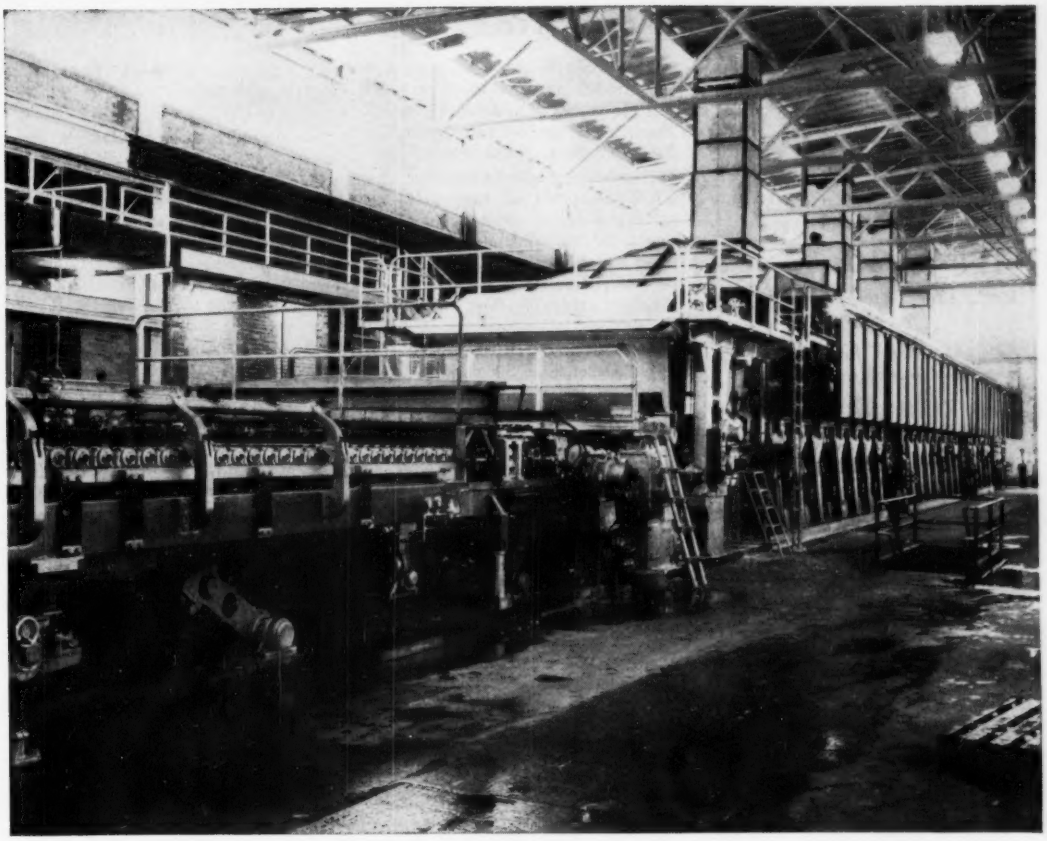
Four for One: Making the case for the chemical industry was Du Pont's Granville Read. Said he: "Standards were only words five years ago; today they mean dollars and cents to Du Pont." Although starting a standards program takes time, money and effort, Read estimates that for every dollar Du Pont has spent on standardization, it has saved four.

In answer to a question from the floor, Read outlined Du Pont's standards organization: A Centrals Standards Committee, made up of about twenty men representing every production department of the company, meets four times a year. Suggestions are sent from the Central Committee to subcommittees in each plant where they are examined by everyone affected. By getting the cooperation of the workers, Du Pont feels it facilitates the acceptance of standards it adopts.

Plans Progress: Carbide and Carbon's J. G. Henderson, chairman of the CICC, gave a progress report on the work accomplished and under way by the various CICC subcommittees:

- Stainless steel pipe and fittings: The subcommittee has succeeded in having Schedule 55 dimensioning for pipe incorporated into ASA B 36.19. It is presently working to extend the dimensioning system of the different schedules to cover pipes made of other materials like copper, aluminum and nickel alloys.
- The subcommittee on stainless steel analysis will shortly recommend the inclusion of a new standard method of analysis for use within the chemical process industry.
- Valves and fittings for fluids in chemical process lines: Despite inherent complications, said Henderson, the work of this subcommittee is progressing satisfactorily. It is planned ultimately that its work be submitted —possibly for development and inclusion in ASA B31, Code for Pressure Piping.
- Unfired pressure vessels: This subcommittee is concerned with de-

* L. to r., Henderson, Nichols, Williams and Read.



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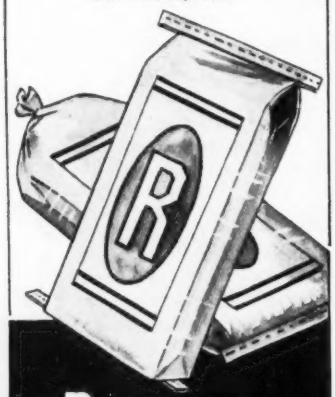

RAYMOND
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PRODUCTION . . . . . .

veloping specific recommendations to the ASME Boiler Code Committee "for the accord of additional considerations to the process industry regarding construction of the vessels."

Henderson emphasizes the fact that CICC welcomes all suggestions regarding standardization projects that might be included in the studies. "Various segments of the industry," he said, "as well as independent chemical companies are urged . . . [to direct] . . . specific requests to the CICC."

The Other Side: Speaking from the standpoint of the supplier, Frank S. G. Williams of the Taylor Forge and Pipe Works, made it clear that equipment men are ready to support any program that will increase the use of standards. Said Williams: "The chemical industry is currently a very large user of mechanical equipment and we have felt for years the need for adequate representation of the mechanical phases of the industry. We are hopeful that the CICC will fill this gap, and we welcome the prospect of a more active participation of chemical industry men in the development of standards and codes of safe construction."

EQUIPMENT . . . .

Package Plants: The Lukenweld division of Lukens Steel (Coatesville, Pa.) is now turning out a line of package plants for extracting oil from cotton or other seeds that run high in oil content. Based on research at the USDA's Southern Regional Research Laboratory (New Orleans), the process employed in the plants is a combination filtration-extraction. Lukenweld thinks performance will stack up like this: oil yields of 98% or better; a high grade meal (free of solvent, oil content less than 1%, gossypol content less than 0.03%); solvent recovery higher than 99%. The firm will offer them in standard sizes with capacities ranging from 75 to 150 tons, will make bigger ones to order. Lukenweld says the plants are designed to permit the small user to convert to solvent extraction without pre-pressing.

•

Safety Pump: Designed for the transfer of hazardous liquids from receiving drums to use cans, a new pump is now being marketed by Protectoseal Co. (Chicago). Key to the safe operation, says the company, are three flame arrestors—placed at the spout, above the bung adopter and at the strainer inlet within the drum. Protected openings also provide for venting and pressure relief. Operating rate: 5 gpm.

•

New Aggregate: At the Armour Research Foundation of Illinois Institute of Technology, last week, John Neff, assistant chairman of the ceramics and minerals research department, described a new fine-grain aggregate. Made by blowing up grains of clay in a special furnace, the material is now being marketed by Kanium Co. (Chicago) sponsor of the ARF project that developed it. Aside from obvious applications in concrete, mortar and plaster mixes, says Neff, the new aggregate could prove valuable as an ingredient in baked clay products where it would permit lightweight refractories and high-temperature insulating materials. Neff also sees a big future for the material as a filler in plastics and road building materials.

•

Anchor Bolts: Super-Grip Anchor Bolt Co. (Philadelphia) has brought out a new pipe bolt and a new eye bolt anchoring assembly. The pipe bolt assembly is used to mount conduit, gas and water pipe to masonry; the eye bolt assembly, to anchor guy wires to masonry. Chief claim made for both is that they provide 50% better "anchorage."

•

Industrial Heater: The Burdett Manufacturing Co. (Chicago) reports it has worked up a new design (Radi-Heat) for use in industrial ovens. Advantages claimed: fuel economy through maximum heat transfer and complete combustion, reduction in processing time, low maintenance costs.

•

Automatic Analyzer: Arnold O. Beckman, Inc. (South Pasadena, Calif.) has added a Model F-3 to its line of oxygen analyzers. Designed for combustion applications in power plants, petroleum refineries, other places, the instrument automatically gives the oxygen content of flue gases. It measures the susceptibility of oxygen to a magnetic field, is unaffected by other gases. The firm figures that it permits more accurate combustion control, thus will result in sizable savings for fuel.

•

On the Level: Fielden Instrument Division of Robertshaw-Fulton Controls Co. (Philadelphia) is now producing an electronic instrument for continuous level measurement. Operation, says the company, is simple and the instrument is especially suited for remote-level measurements on a wide range of materials.

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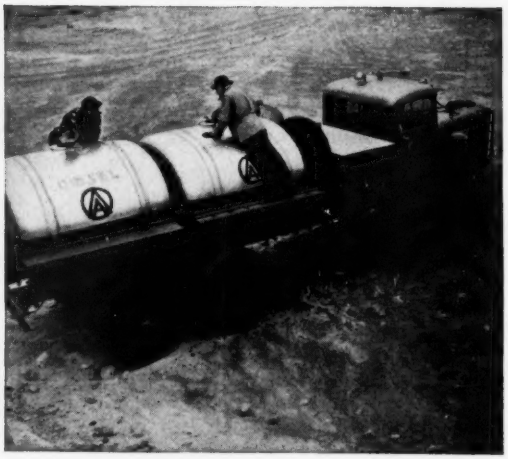

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Chemical Newsfront

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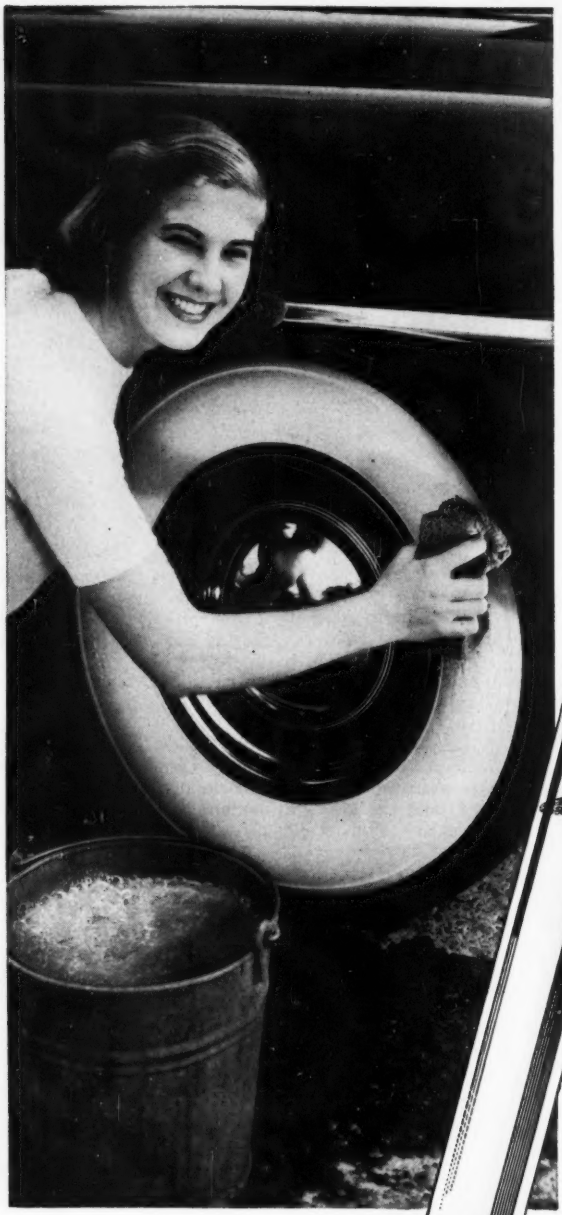
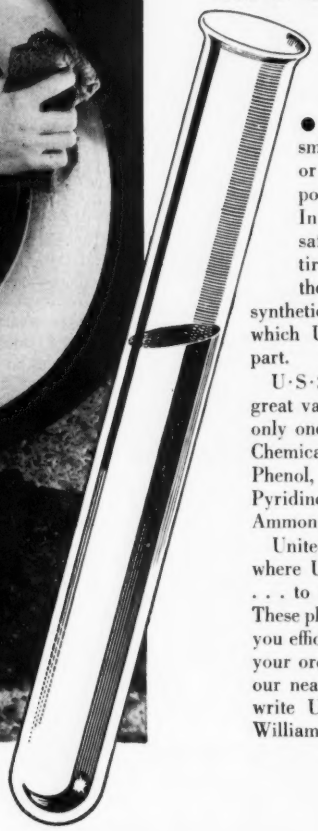


U·S·S COAL CHEMICALS

are in the picture



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UNITED STATES STEEL

MCGRAW-HILL WORLD NEWS

INDIAN INTERVIEW: "I have no complaint, but . . ."

As Others See Us

Last month, Shireen Dalal, one of CW's overseas representatives, took a walk into the heart of Bombay's teeming bazaar. She was on her way to interview Ramniklal Joshi, an Indian importer of heavy chemicals. Squatting on a cushion in the offices of Haribhai Jeebhai, Joshi had this to say about his dealings with American manufacturers and exporters.

"I have no complaint against American exporters. The import of chemicals is licensed, and dollar licenses are granted only for items which cannot be obtained from the sterling area.

"What I do import from America is of good quality, and I usually get what I ask for—only occasionally do I feel that I am sent surplus material. Prices, however, are high at present and I am importing a great deal from European countries."

Elsewhere around the globe, similar men were giving their views about the American chemical industry, now the undisputed world leader in its field. What they had to say adds up to a pat on the back for the U.S. chemical executives.

But it also contains a hint of trouble in the offing. It takes dollars to buy American chemicals—and too many countries find that they don't have enough dollars to buy essential foods, raw materials, and chemicals too. Where choices have to be made, chemicals from the resurgent industries of Germany, Japan, England and other "soft currency" countries look mighty attractive.

Brazil: Nowhere is this warning more clearly stated than in a report from South America's largest country, Brazil. B. Herzog is president of a medium-sized Rio de Janeiro importing firm which specializes in "everything chemical." Says Señor Herzog:

"The situation here is bad. We have not been able to obtain import licenses for the last six months. During that time we have been practically out of business, doing only about 20% of our normal business with the U.S.

"Last year they gave us too many licenses, and everyone bought a lot of chemicals. Now there is too much inventory, and fewer consumers. We have the unusual situation of not being able to import chemicals and at the same time we have no buyers for chemicals.

"But if you can't buy chemicals from the U.S., you buy them from someone else. Brazil will buy more and more chemicals from Germany, because terms are more liberal. 'If you don't like our terms,' some American exporters in effect say, 'you can go to hell.'"

Japan: More heartening news than this comes from two Nipponese chemical executives. Kiyoshi Minakawa, research director of the Association of Importers of Chemical Goods reports:

"Apart from the limitation imposed by the government on account of the

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* 36	180 min.	5 to 7	5 to 6	30-35	75-85
200	190/195	10 max.	Br. to Bl.	Nil	Nil
500	190/195	10 max.	2 to 2½	Nil	Nil
700	190/195	5 max.	2 to 2½	Nil	Nil
1035	195/200	2 max.	2 to 2½	Nil	Nil
Jet Black	185 min.	11 to 16	Black	Nil	Nil

*Emulsifiable Waxes.

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3 RESEARCH

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dollar shortage, we importers of chemical goods have no difficulties whatsoever in importing chemicals from the U.S.

"In fact, we have found so far that practically every U.S. company is active in exporting its products, at least to Japan. We cannot find a case in which an importer of U.S. chemicals encountered any difficulty because of an American company's attitude."

His sentiment is echoed by Toshimitsu Okubo, secretary-general of the Association of Importers of Pharmaceuticals. Okubo, who is also a director of the Sankyo Pharmaceutical Co., has this to say:

"Our relationship with American companies is very satisfactory. We find practically every American company is actively interested in exporting its goods to Japan."

South Africa: Around the world and below the equator, lies a growing chemical marketplace: the Union of South Africa. Queen of the Transvaal area is bustling Johannesburg, site of the General Chemical Corp. Ltd. (no relation to the Allied Chemical division of similar name). Joint managing director of this firm is David Hayden, who has a warning for American exporters:

"The U.S. is losing ground here with respect to chemical supplies, other than naval stores. Suppliers from continental Europe are making considerable inroads in the South African market and are concentrating on establishing themselves. They have the twofold advantage of prices being considerably less than the American ones and of selling for 'soft' currency.

"The quality of American chemicals now on offer is good, and manufacturers here have no complaints. When the sellers' market prevailed until relatively recently, however, what we got left much to be desired."

England: Well known in New York import-export circles is forthright Curtis Berk, a director of F. W. Berk & Co. Ltd., chemical manufacturer and trader. Interviewed in London, Berk had some sympathetic words for his U.S. associates:

"We all know the American companies aren't philanthropists, but they are less difficult to deal with than most other countries' firms.

"We do roughly a quarter of a million dollars worth of business with the U.S. every year, importing bentonitic clays, diatomaceous earth, crude drugs and by-products from the wood pulp industry. Our relations in all these fields, on the whole, have been excellent.

"The only thing that sometimes makes trade difficult with American firms is the dollar snag. In the normal course of events, this would be no problem. But now, the Ministry of Materials often cuts our dollar import licenses—and sometimes without rhyme or reason. This makes it hard for the American exporters. They can't plan very far ahead in their sales relations with us because they never know how much we will be able to buy.

"It's only natural, in that case, for American firms to look for surer and steadier markets—South America for instance—rather than to sell to British companies who can buy one month and can't the next."

A British compatriot of Berk's, E.

RAND DAILY MAIL

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for shipping any type of gas

SAFELY and at *LOWER COST!*

Choose Hackney Cylinders—and be sure your products are fully protected—both in transit and in storage. Rugged Hackney Cylinders are deep drawn from quality metals. Skillful fabrication and controlled heat-treating add still further to their strength and durability.

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CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

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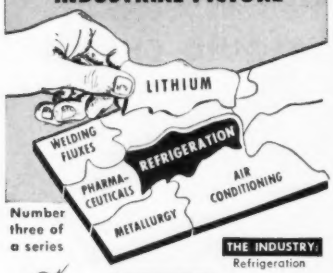

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SCARMIGLIA

ROME

F. Roscoe, a department head at M. W. Hardy & Co.'s London headquarters, also feels that government interference was the main cause for trouble between English and American companies. But his indictment also includes the U.S. government.

"We're hedged in by licenses of every description as far as buying in dollar markets is concerned.

"Our customers are delighted with anything for which we can get a license, and the U.S. industry gives us all support."

But Roscoe reports that he is plagued by American export licensing too—in addition to the struggle with his own government. He points out that he often has to wait six to eight weeks to get a license from Washington to import any of the large number of U.S. chemicals which are subject to export licenses. He has lost more than one contract because of this delay. Moreover, very often the British importer has to hedge against changes in market price of a given chemical—at a considerable risk—while Washington officialdom screens the application for its export.

Like many European merchant exporters, Roscoe is frank to say that he thinks America's policy on East-West trade is something less than enlightened too. His company, like many others in London, has a long history of doing business with China and Germany. Today the firm is doing what business it can, legally, with East Germany and Communist China.

Italy: The New York Mercantile Corp. is not listed in the Manhattan telephone directory. But in Rome it is known as one of the largest of Italy's importers of chemical products from the U.S. For despite its name, it is exclusively owned by Italians.

James Ryan, Mercantile's managing director, created the business after the war when he was convinced that Italy would be a natural market for the newer American insecticides and farm chemicals. As sole agent in his country for several American manufacturers, Ryan prefaced his remarks by noting that his observations were of a general nature and not applicable to his own principals, who have done all in their power to assist him in his work. As for the others, Ryan does not mince his words:

"The attitude taken by most American firms is one of selling abroad only when they have surplus supplies on hand. When the situation on the American market changes, the first to be sacrificed is the foreign importer, even after years of profitable work in common. It is more difficult to enter into business relations with British and German firms because of their bureaucratic organizations and their excessive caution. But once work has been started, the importer is bound to them with iron cables.

"The British and German firms grant longer terms of payment and give more technical assistance, both by correspondence and by sending experts to visit the importer.

"Even when market conditions change, the foreign importer can always count on a certain quota being held at the disposal of regular customers."

On the credit side, Ryan has this to say:

"The American manufacturers are undoubtedly now at the head of all

MCGRAW-HILL WORLD NEWS

LONDON

YOUR PROCESSING COSTS GO DOWN

AS CHEMICAL PURITY GOES UP

...That's why cost-minded production men also demand

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'Baker Analyzed' *REAGENT* ACIDS

"What is one of the most effective ways to help lower processing costs?"

When acids are a raw material, you can frequently eliminate several purification steps at the end of the process, when you use the Reagent Grade of Hydrochloric, Sulfuric or Nitric Acid.

Cost-minded production men know that processing costs go down as chemical purity goes up—and to achieve their aims they insist upon 'Baker Analyzed' Reagent Acids.

Their reasons are two-fold: (1) Greater uniformity in the finished product because of Baker's higher, defined purity, and (2) elimination of guesswork, cutting down of production steps, saving time and money, because the actual lot analysis of the chemical is on the label.

Next time—every time—specify 'Baker Analyzed' Hydrochloric, Sulfuric, and Nitric Acids. See how much you gain in time and freedom from trouble by eliminating impurities from the start.

'Baker Analyzed' Reagent Acids are available for scheduled delivery in carboys, truckloads and carloads. Their higher purity quickly reflects itself in lower processing costs of your finished product.

J. T. Baker Chemical Co.
Executive Offices and Plant, Phillipsburg, N. J.

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135 Thorn Street, Reading, Pennsylvania

DISTRIBUTION . . . .

the traditional exporting businesses. This is due not so much to the forced paralysis of the German industry as to the enormous volume of capital assigned by the American chemical industries to the improvement of their products and the search for new preparations."

In Ryan's words lie both a challenge and an opportunity for the chemical process industries of America.

Peddlers' Era

Charles Sawyer and his Commerce Department have been making headlines during the last few weeks on a common theme: the biggest problem which American industry must face during the coming years is the task of disposing of the vast quantities of goods which the nation's production machine is now capable of producing.

In a speech to the New York Sales Executives Club, Sawyer summarized the job as he saw it. "American industry must now work just as hard to develop techniques as it has worked in the past on production techniques —a process requiring continued development of advertising and marketing."

Chemical salesmen, fighting their way up out of the past summer's buyers' market, are half-amused to hear that Washington is finally realizing the truth in the old selling adage: "No wheels turn until a sale is made."

•

Jigsaw Puzzle: General MacArthur and his successors in Japan have worked hard to break up the former Mitsubishi interest. But on the international pages of a New York business paper, several of the fragments were briefly reunited when their individual advertisments were, by coincidence, placed in juxtaposition to each other. The three: Mitsubishi Chemical Industries Ltd. ("Popular with Superior Chemicals"); Mitsubishi Heavy-Industries, Reorganized, Ltd. (steel fabrication); and the Chiyoda Bank Ltd. (formerly the Mitsubishi Bank, Ltd.).

•

New Addition: Merck & Co. is adding to its St. Louis distributing facilities, which service a twenty-four-state area, by constructing a 24,000-square-foot standardized-steel warehouse on one side of the existing building.

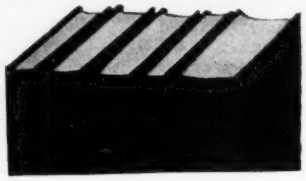
•

Into Philly: Cleveland's B. F. Goodrich Chemical Co. has expanded its distribution network with the establishment of a new sales office in Philadelphia. The three-man staff will represent Goodrich on sales of Geon polyvinyl materials and Hycar American rubber.

Figure the DOLLAR VALUE

of consistently finding the right answer to chemical plant problems

Think what it would mean to you, in handling any kind of chemical plant operation, to have at your fingertips the know-how and know-what of countless experts who have performed the same and many similar operations. To be able to quickly look up any of thousands of facts that other men have discovered gives you a chance to save your company time, work, and money—to boost your personal value in a way that will be appreciated in dollars. Just such a host of facts can now be at your fingertips, with this data-packed set of books on chemical calculations, economics, unit operations, industrial chemistry, and materials of construction.



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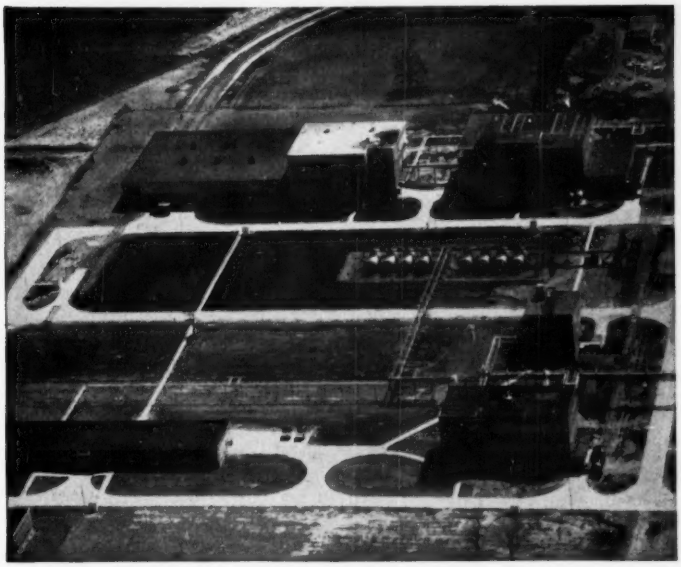
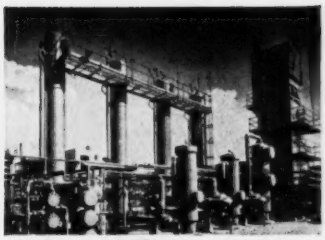




Hydrogen Plant. This plant, the second Girdler HYGIRTOL* unit purchased by Lever Brothers Company, assures a dependable source of high-purity hydrogen for hydrogenation of vegetable oils at Lever's new Los Angeles plant. Instruments control the process, and only one man is required to keep the plant in operation, furnishing hydrogen at any desired rate. Purity generally exceeds 99.8%, and operation is safe, quiet, and clean.

GIRDLER DESIGNS AND BUILDS

New plastics materials plant for B. F. Goodrich Chemical Co. in record time!

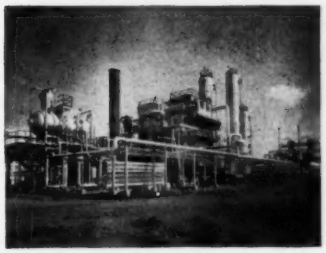
HERE is the fourth major chemical project completed by Girdler for B. F. Goodrich Chemical Company . . . a plant now producing large quantities of Geon® polyvinyl materials.

Based on Girdler's past performance, B. F. Goodrich Chemical assigned Girdler a "package" contract for process engineering and construction. The plant was completed economically and in record time to meet the increased demand for Geon materials for consumer and defense use.

For process plants in the chemical, natural gas, and petroleum industries, Girdler assumes unit responsibility for design, process engineering, and construction. Such coordination centralizes responsibility, and saves time.

To assure successful results, call on Girdler in the *planning stages* of your processing facilities.

*HYGIRTOL is a trade mark of The Girdler Corp.



Synthesis Gas Plant. Girdler has broad experience in handling complete "process packages", covering design and construction of process plants involving very high operating pressures, high temperature reactions, and corrosive substances. This synthesis gas plant is a unit of a complete synthetic nitrogen fertilizer plant which operates with a lower unit energy input than any similar plant in existence.

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Girdler's Gas Processes Division designs and builds plants for the production, purification, or utilization of chemical process gases; purification of liquid or gaseous hydrocarbons; manufacture of organic compounds. Write for Booklet G-35. The Girdler Corporation, Gas Processes Division, Louisville 1, Kentucky. District Offices: New York, Tulsa, San Francisco. In Canada: Girdler Corporation of Canada Limited, Toronto.

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Because when you do this you avoid
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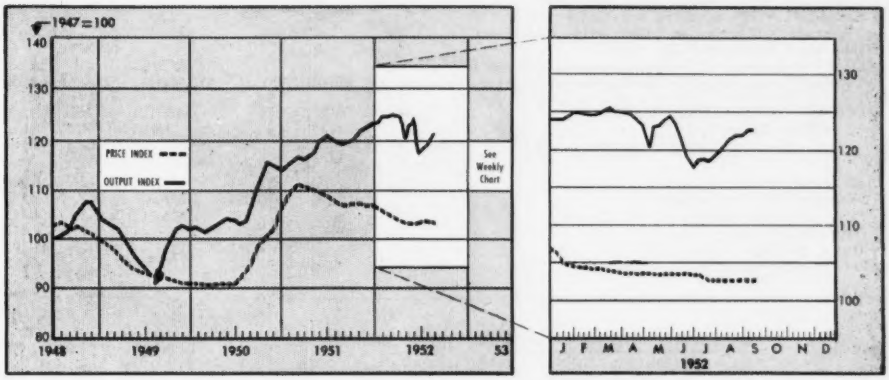

CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries

MARKET LETTER

Some significant price changes this week are taking the spotlight in the chemical market-place.

The new copper naphthenate price tag, 21½¢/pound, clearly reflects the military's stepped-up mildew-proofing program. The government's call for more sand bags, rope, cotton duck—outlets for the naphthenate—have producers in a happier mood than they were in a few months ago.

Slack demand then had the price down to a profitless 18½¢/pound. On the other hand the new perk-up may well cause the price of copper naphthenate to climb close to the ceiling—26¢.

The usual reason—increase in manufacturing costs—is behind the upped price of some synthetic coating resins. The boost (½¢-1¢/pound) is limited, for the most part, to resins whose main applications are in the paint, varnish, lacquer fields.

Not all producers, however, are going along with the price-rise—at least not at the moment.

Quicksilver, too, rose last week. The first price change in nearly two months sent the price-per-flask up $3, to $194.

The previous price ($191), the year's low, was quoted thus in July. Some trade sources indicated the increase last week occurred on a small amount of business, may herald further changes.

NPA dished up some good, some not so good news to the paint industry in Washington last week.

On the dim side: Controls on tin must be continued until supplies coming into the country are sufficient to meet needs of many small consumers: Four of the metals used by the paint industry still carry NPA's "short supply" label—selenium, cobalt, tungsten, molybdenum.

Chemicals and chemical compounds with the same tag, according to NPA, are paraphenylphenol resin, cobalt salts and driers, copper chemicals, methylene chloride, selenium compounds.

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947=100)	122.8	122.6	121.0
CHEMICAL WEEK Wholesale Price Index (1947=100)	102.5	102.3	107.2
Bituminous Coal Production (daily average, 1,000 tons)	1,971.0	1,825.0	1,820.0
Steel Ingot Production (1,000 tons)	102.3		
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	240.0	242.2	256.5
Chemical Process Industries Construction Awards (Eng. News-Record)	$10,040,000	$7,244,000	$7,812,000

MONTHLY INDICATORS—Trade (Million Dollars)	MANUFACTURERS' SALES			MANUFACTURERS' INVENTORIES		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All Manufacturing	$21,700	$21,848	$21,249	$42,128	$42,213	$39,908
Chemicals and allied products	1,556	1,509	1,535	3,062	3,062	2,850
Paper and allied products	635	605	637	1,034	1,058	917
Petroleum and coal products	2,016	1,997	1,912	2,635	2,561	2,481
Textile products	1,139	1,086	1,182	2,592	2,542	3,222
Leather and products	212	229	298	515	518	652

On the brighter side: The paint industry can look for some "decontrols" of tin, terneplate in the not too distant future—probably six months or less: A proposed "housekeeping" amendment to NPA Order M-25, Cans, is in the works, that permits the use of .25 pound tin plate wherever it is necessary to solder a metal can.

Such an amendment affords partial relief to paint makers who must now use black plate as paint containers.

But there's no immediate relief for coal chemicals producers, or so said OPS last week. The agency opined that the industry doesn't rate price relief under ordinary standards.

Reason advanced for the turn-down: Coal chemicals are produced by three separate industries (steel, public utilities, coke-oven operations) making it difficult to compare earnings of all three under the same criteria.

OPS, however, did not slam the door completely shut, did ask the producers for additional data to support their plea for higher ceilings.

Lower castor oil prices are being offered this week. Latest in a series of price reductions (½¢/pound) pegs the price for USP material at 26¢/pound in tanks, 27¢ c.l.

The lower castor oil price, however, will probably not increase volume of sales because USDA still restricts consumers' use, inventories.

By this week zinc customers are wondering if the market price is really stabilized at 14¢/pound (East St. Louis). The series of ½¢ increases and decreases in the last couple of weeks finally culminated in a dual price market (for one day) late last week.

Major sellers trying to maintain a 14½¢ price level found it difficult to do so while others offered zinc for 14¢. The capitulation equalizes the market—for the moment.

Trade talk of the Government's interest in possible stockpile purchases for next year may well bring further developments in the zinc marketplace.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending September 27, 1952

UP

	Change	New price		Change	New price
Manganese dioxide, African, 84-87%, paper-lined burlap bags, wks., ton	$ 5.00	$86.00	Casein, Argentine, acid-pricip., grd., 100 bags or more, ex dock	.0225	.22

DOWN

	Change	New price		Change	New price
Castor Oil, USP, drms. c.l.	.005	.27	Cresylic acid, 50%, above 210 deg., per gal., t.c.	.25	1.20

All prices per pound unless quantity is stated.

for American Stores Co. GRAVER fabricates 20 Giant Silos

AT WORLD'S LARGEST AUTOMATIC BAKERY

For American Stores' new 17-acre bakery and warehouse in Philadelphia, Graver supplied twenty bins where flours and sugars, conveyed by air suction from specially designed hopper railroad cars, are stored in readiness for automatic mixing. This air-conveyor system—of which the Graver silos are a part—is the first of its kind in any automatic bakery. The battery of Graver-built storage bins has a capacity of 1,200 tons. Each bin is 8′ in diameter and 90′ high.

It is significant that American Stores should turn to Graver to fabricate these high steel structures, since it indicates once again the wide range of industries which regularly recognize Graver's leadership as a manufacturer of storage vessels of all kinds. Fabricated with utmost care, these bins are one more example of the quality craftsmanship and individual attention which characterize every Graver product.

AMERICAN STORES CO.

Since its incorporation in 1917, the American Stores Company has grown into an organization of over 700 self-service markets and over 1,200 stores employing about 18,000 persons in seven eastern States and the District of Columbia. The 17-acre Philadelphia bakery and warehouse services 900 of the company's Acme self-service supermarkets and American Stores in eastern Pennsylvania and southern New Jersey.

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How Celite filtration assures purity, speeds production

When producers of antibiotics sought a filter aid that would assure removal of all mycelium and other gelatinous impurities in the broth from which wonder drugs are extracted—and speed their "put-through" in the bargain—Celite ended the search.

The effectiveness of Celite can be attributed to these important factors which make it unique among filter aids:

Carefully processed from the purest deposit of diatomaceous silica known, Celite is available in nine standard grades—each designed to trap out suspended impurities of a given size and type. Whenever you reorder, you are assured of the same uniform, accurately graded powder received in your initial order. Thus, with Celite, you can count on consistent purity in your filtrates—at highest rate of flow—month after month, year after year.

The manufacture of wonder drugs is just one of the many processes in which consistent purity and faster filtration have been obtained through the use of Celite. Your own filtration problem, regardless of the product involved, can no doubt be solved with the proper grade of Johns-Manville filter aid. To have a Celite Filtration Engineer study your problem and offer recommendations, without cost or obligation, just write Johns-Manville, Box 290, New York 16, N. Y.

Celite is a registered Johns-Manville trade mark

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Johns-Manville CELITE

FILTER AIDS

Sulfur Shortage Nears End

Supplies of sulfur and sulfuric acid, adequate this summer, are likely to tighten in next quarter as seasonal demand mounts.

By spring of 1953, new production, mostly from Frasch mines and sour gases, will help supply catch up and keep up with demand.

Aftermath of the sulfur shortage will be far-reaching, speeding up new output, diversification, and conservation.

The once long waiting-line of customers for sulfur and sulfuric acid has been growing shorter, waiting less, and getting more. Hardly a customer today has any trouble getting adequate supplies of either with little delay. This same situation has been in effect throughout most of the summer, partly because of increased supply, mostly because of decreased industrial demand. The labor stoppage in the steel and petroleum industries has further eased supply.

This improvement has been recognized officially. The National Production Authority, the government's supply guardian, has recently removed controls on sulfuric acid and now allows sulfur consumers a 60-day inventory in place of the earlier 25-day supply. Many of these users have been hoping or expecting that this NPA action means an early lifting of all controls, which in most cases holds them to 90% of the amount they used in the 1950 base period. Among other evidence, they cite the increase in producers stocks since last year (*table, p. 80*).

However, though other supply concessions by NPA are likely, complete removal of controls at this time is not. In fact, this fall and winter should see supplies tightening up once more. The biggest single use for sulfuric acid is in the manufacture of two important fertilizers – superphosphate and ammonium sulfate. Not only are they in growing demand, but the peak of their production season is approaching. These two fertilizers combined account for over one-third of the sulfuric consumed. In addition to the acid as such, sulfur and its family are widely used for dusting powder, pesticides, and fumigants. A recent development of sizable potential is the use of sulfur dioxide in preservation of silage.

Industry's Call: It so happens that industry will also need considerably more sulfuric acid this fall than during the past summer. This seasonal upturn is true in most years, but should be even above average this year. Almost every process industry takes sulfuric in large tonnage, and most of them for various reasons will have heavier needs. For instance, some of the important consumers have been in the doldrums and are just coming out: viscose rayon, cellophane, and the pulp and paper industry, all calling for more sulfuric.

The steel and petroleum industries will be carrying an extra load while trying to meet higher civilian needs and to catch up with the mobilization timetable after the summer strikes. Since both of these industries are expanding and play a key role in the defense program, neither will go short.

The production of other chemical products, which in turn have many applications of their own, is the biggest industrial outlet for sulfuric. These include hydrochloric acid and hydrofluoric acid among the heavy chemicals. In the organics, synthetic detergents and phenol are probably the most important of the many sulfuric takers. Altogether, these chemical products need about a quarter of the sulfuric produced each year, though the over-all demand grows slowly and steadily rather than showing much seasonal variation.

Greater seasonal business will have an effect on sulfuric consumption in the manufacture of paints and pigments. Defense needs will take more sulfuric to make "mixed acid" for explosives. In addition, mounting demands on the rubber industry will take increased tonnages of sulfur and sulfur products. With this upcoming pressure by their customers, acid producers will be kept busy to fill orders from the available supply, but the pinch even at the height of demand should remain moderate.

Saving Factors: By next spring the shortage should be over, but it would have been much worse without the activity and cooperation from many quarters. The chief factors in the early improvement have been:

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Estimated Increase

U. S. SULFUR OUTPUT
(Thousand Long Tons)

	Native	Recovered	Increase for Year
1952	325	85	410
1953	430	250	680
1954	170	150	320
1955	160	100	260
Increase over 1951	1,085	585	1,670

• Stepped-up production from Frasch mines and other sources.

• Allocation and controls, first by industry and then by NPA.

• Conservation of sulfur use and improved processing in production and recovery.

By far the major part of U.S. sulfur supplies (about 85%) has been obtained from salt-dome deposits that can be mined by the hot-water (Frasch) process. These Frasch deposits, found only along the Gulf Coast, are mined by four U.S. producers. Texas Gulf Sulphur and Freeport Sulphur, the leading producers, account for about 90% of the total, which has been around 5 million long tons for the past few years. The rest of the Frasch sulfur is mined by Jefferson Lake Sulphur and Duval Sulphur and Potash.

All four producers, aware of an impending shortage of Frasch deposits even before Korea, have been and still are constantly searching for new domes. Their efforts have been successful from the production standpoint, though the cost of exploration and mining the sulfur have been climbing steadily.

Here is a rundown on the new Frasch mines coming in during this year and next:

Company	Mine Location	Start-Up	Capacity (M Long Tons/Yr.)
Texas Gulf Sulphur	Spindletop, Texas	July, 1952	400
Freeport Sulphur	Bay Ste. Elaine, La.	October, 1952	100
Freeport Sulphur	Garden Island Bay, La.	Fall, 1953	500

Total New Capacity ('52-'53)—1 million long tons/yr.

In addition, producers are getting more from their present mines where possible, though three small mines are approaching depletion. However, Freeport has been able to step up output at its Grande Ecaille, La., mine by some 100 thousand tons this year, and Texas Gulf will complete its 200-thousand-ton-a-year expansion for the mine at Moss Bluff, Tex., in the first quarter of 1953.

Other Means: Among the non-Frasch processes, the biggest growth since the shortage has come from recovery from natural gas or refinery gas containing hydrogen sulfide. This contaminant has proved a blessing in disguise, since it usually has to be removed anyway before the gas can be used. Many of the petroleum companies and some other consumers of sulfur or sulfuric acid are jumping at the chance to get their own supplies. This trend has been especially noticeable in the West, and concentrated mostly in West Texas, Wyoming, and California, where sour gas is plentiful and savings in freight a prime consideration. But refiners and other heavy consumers of sulfur in other sections of the country are also moving in the direction of self-sufficiency.

Other eyes are turning to the recovery of sulfur value in smelter gas, which is relatively dilute sulfur dioxide. Making sulfuric acid from this by-product has become more feasible because of improvements in recovery processing. Four companies expect to recover acid from smelter gas before the end of next year: American Smelting & Refining, American Zinc Co. of Illinois, Bunker Hill & Sullivan, and Garfield Chemical. The future growth of this sulfuric recovery method will depend to a great degree, after the shortage ends, on finding a near-by market for the sulfuric, such as mak-

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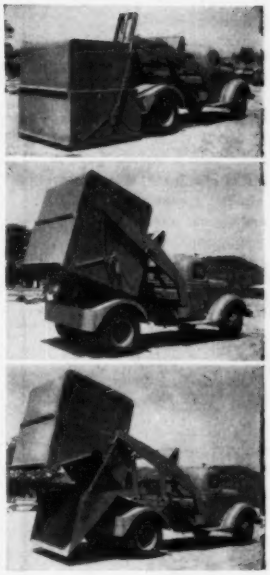

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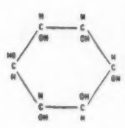

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Native U. S. Sulfur

PRODUCTION AND STOCKS (1946-52)

(Million Long Tons)

	Production	Stocks (Year-End)
1946	3.86	3.77
1947	4.41	3.37
1948	4.87	3.23
1949	4.75	3.10
1950	5.19	2.65
1951	5.28	2.84
1952	5.60*	3.10*

* Estimated

ing superphosphate in the West.

Surface sulfur deposits not amenable to Frasch mining have received more attention in the past two years. Four Western companies intend to develop holdings of this type, but the total output in the next two years will probably be less than 100 thousand tons. Despite processing improvements worked out since the shortage, this is generally considered a high-cost operation, and not competitive except in a very few locations.

Global Action: Increasing the production of acid from pyrites has not aroused as much interest in the U.S. as in other countries, which since the War have been counting heavily on importing Frasch-mined sulfur from this country. Future dependence on U.S. imports in the next 2-3 years will diminish, resulting in further improvement in domestic supplies. Most of Europe will be using pyrites from Spain and Portugal, though output of Sicilian sulfur is slated for a capacity boost of 50 thousand tons by the end of 1953. England and other countries in Europe and Asia should complete projects by the end of 1954 to make acid or ammonium sulfate from gypsum.

Canada is making rapid strides for self-sufficiency. Canadian Industries Ltd. will soon be making acid from a rich smelter gas at Copper Cliff, Ont.; Noranda Mines Ltd., in Quebec, should complete a new plant to make sulfur and sulfur dioxide from pyrites by next summer; and others are planned or on the way. Mexico is expected to become an important producer of Frasch sulfur in the next two years. At least four companies are now prospecting around Tehuantepec and at least two of them are expected to begin drilling before the end of next year.

Shortage Aftermath: All of these developments, both at home and abroad, add up to an early end to the sulfur shortage. Despite the inconveniences it has caused, the shortage may prove a boon in the long run, for it has fostered the diversification of sulfur sources. The improvements in processing and conservation practices will help to extend sulfur reserves. And even if future demand should require higher-cost production facilities and a concomitant sulfur price increase, the consumer will stand to benefit from better distribution and less shut-down time.

Sulfur (and sulfur equivalent) from U.S. Production

(million long tons/year)

	Output	%	Output	%
	1950		1955 (est.)	
Native Sulfur				
Frasch	5.19	85.3	6.22	76.9
Surface	.00	.0	.06	.1
Recovered Sulfur	.14	2.3	.90	11.1
Sulfur Equivalent of Acid				
Smelter Gas Pyrites Hydrogen Sulfide	.76	12.4	.96	11.9
Total	6.09	100.0	8.14	100.0

SANTA CLAUS

Could Die of Old Age

No one shoots Santa Claus. This remark about a government which spends and spends and spends may well be true. But it is also true that Santa Claus is an old man. At his age overwork might well kill him.

It is with the possibility of working Santa Claus to death that this editorial is concerned. No position is taken as between the contending political parties in the present campaign. Our concern is with the problem of protecting Santa Claus.

It is true that as a nation we now enjoy great prosperity. The prosperity is not nearly so general as the political advertisements of it would suggest. Millions of individuals, notably those living on pensions, annuities and other fixed incomes, have been robbed of half their purchasing power by inflation during recent years, and whole industries know little or nothing of boom times.

However, measured by so basic a gauge as unemployment, we do have great prosperity. Less than two million of our total working force of over 64 million are unemployed, and many of them are unemployed only while moving from one job to another. The real income, i.e., what their dollars will buy, of those with jobs is somewhere near its all-time peak.

Our Prosperity is Precarious

The prosperity we enjoy, however, is precarious. This is primarily because it is dependent upon a rising volume of expenditures by the federal government. At present almost a quarter of our entire national income is ladled out through Washington, and in an ever increasing amount.

If, as matters now stand, federal expenditures were to be suddenly and sharply cut, our government-financed prosperity would be severely upset. But if the federal government were to try to keep right on providing prosperity by steadily increasing its expenditures, the end result would be more certainly disastrous. It would be a crash caused primarily by having continuing inflation of prices destroy the value of the dollar.

Higher government expenditures of worthless dollars then could accomplish nothing. Santa Claus would be dead from overwork.

To Provide Firm Foundations

The general route to be followed in putting firm foundations under our prosperity is quite clear. It involves two steps which must be taken closely together. The first is to stop the continuous increase in federal expenditures. The second step is to substitute expanding private business for government-financed business as the principal foundation of expanding prosperity.

The increase in federal expenditures can be stopped without sacrificing any effective measures now directed toward meeting our top priority requirement—protection from armed Communist aggression. The most competent authorities of both major parties agree it can be done by (1) better planning of and the elimination of outright waste in defense arrangements, and (2) cutting those civilian expenditures which cannot be justified at the same time we are undertaking a great new load of defense expenditure.

It is also possible to substitute expanding private business for government-financed business. The problem is primarily that of relieving private business of the staggering load of federal taxation it now is carrying. Federal taxation now takes 52 per cent of all corporate profits and 82 per cent of all so-called excess profits. If it were not for the forced draft placed under our economy by rapidly mounting defense expenditures, this burden would surely lay a disastrous blight on private business expansion. If expanding private business is to have a chance to play its critical role as a substitute for government-financed business, its taxes must be cut, and soon.

It Won't be Easy

It would be naive to contend that it will be easy to check the expansion of federal expenditures. They have been running wild too long, and in the process contributing to a feverish, inflationary prosperity. Likewise, there is no reason to believe that the easing of the load of business taxes is going to be easy. The basic blight it puts on business expansion has been too long obscured by having our economy dosed with artificial stimulants, most notably enormous injections of federal expenditures.

The Key Question—How Long?

It is obvious that prosperity is going to be a major topic of discussion in the present political campaign. There is nothing the matter with that. Prosperity is a key concern of the voters in choosing a national administration.

To make the discussion of prosperity really useful, however, it is important to ask and get answers to the right questions about it. The key question is not whether or not we have prosperity. That we have it in large measure is generally conceded.

The key question is, "How long can we continue to have prosperity?" The answer—not very long if we continue to rely primarily on new injections of inflationary federal expenditures. Santa Claus, be it remembered, is no youngster. If we continue our present improvident course, he will be worked to death. Those politicians, regardless of party, who see this clear danger and who have plans to escape it are facing up to the crucial question about our prosperity.

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JUNEX PRODUCTS

POUNDAGE POWWOW: Medical advice to weight conscious public boosts . . .

Fat Profits in Slimming

Cellulosic reducing aids—pills made with carboxymethylcellulose (CMC) or methylcellulose (MC)—have towered to lofty multimillion dollar sales in three years.

Consumption of cellulosics for slimming pills may touch a million pounds annually.

Plump U. S. market is being tapped now; Canada appears slated for big distribution of the CMC and MC tablets too.

Maybe it's vacation-time opportunities to eye bikini'd bodies, maybe it's just a by-product of boom times. But what ever the cause, methylcellulose-(MC) and carboxymethylcellulose (C-MC)-based reducing pills are now a booming multimillion dollar business.

This week, with sales climbing, one maker of these tablets, Ronald Research Laboratories (Baltimore, making Fastabs) has readied facilities to step into the Canadian market with a high-CMC-content formulation. Ronald, though not top dog sales-wise, and far from the first to sell a cellulose pill in the U.S. or Canada, illustrates the rabbit-fast growth in the weight-cutting enterprise.

Already, consumption of these tablets is enormous; the millions produced already swallow up CMC at close to 50,000 lb./month clip; MC consumption is also booming.

Adiposity Parley: At the roughly 70¢/lb. price for these cellulosics, trimming off excess poundage has become a tasty* business even at the basic supply level. Figuring it on retail sales, it becomes even more impressive; $12-15 million in sales may well be a conservative figure. The cellulosics are only the latest touches in the game; the boom for them began roughly with the '50's.

And supplying these cellulosics is largely the business of two firms. Dow Chemical is the only current quantity producer of methyl cellulose—calls it Methocel. Carboxymethylcellulose is produced mainly by four companies, Hercules Powder Co., Du Pont, Wyandotte Chemical Corp., and H. Kohnstamm & Co., Inc. Although all four turn out technical grades—widely used industrially—Hercules is top booster of purified CMC—used in foods, pharmaceuticals.

The pills are sold by a number of concerns, some of which make them at their own facilities, but many of whom depend on medical supply houses. In addition to Ronald Labs, CMC types include Wafex Inc.'s (New York) Wafex, made by the Arner Co. Methyl cellulose, to make a partial list, has Junex Product's (Chicago) Junex, Thrifty Drug Co.'s Roxie, and

* Tasty, and certainly filled with variety. In addition to tablets (and there are plenty besides the cellulosic based), treatments run from special exercises to hypnotism.

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Obesity vs Mortality: One factor in reducing-pill sales.*

Age of overweight person	Percentage above mortality norm	
	Men	Women
20-29	80	34
30-39	69	52
40-49	52	50
50-64	31	38
Average (20-64 years)	50	47

* Table based on figures from the Metropolitan Life Insurance Co., but in no way indicate that company's approval of any reducing compounds.

McKesson and Robbins' Kessamin on its roster. Junex looks like the overall sales leader; others, depending upon area promotion, sometimes have the local sales prize.

Swelling Business: The mode of action of the cellulosics hasn't been nailed down definitely yet. Some compounders figure the MC and CMC, which absorb water and swell, have a bulking effect in the stomach, eliminate the "empty" feeling.

Others, admitting the thickening properties of the cellulosics, stress another angle: the CMC or MC merely aids in keeping tastebud-deadening sweet compounds on the tongue, where they cut the appetite.

Perhaps both aspects are important. But both MC and CMC have wide (wider, probably than in reducing pills) use in laxative, where the neutral bulking properties are put to use. One medical products house has this year turned out 35 million laxative-, 12 million reducing-pills of CMC.

Filling Pills: With their appetite reducing qualities, (A slick ad phrasing: "Eat all you want") the cellulosics nevertheless appear to be almost unchanged in their passage through the system. With wide variation, most reducing pills contain about 2 grams of the cellulose derivatives per daily dose (Fastabs are being revised to boost this to about 3.5 grams, approaching the laxative level of approximately 5 grams).

Many of the pills—or at least pills sold with the reducing "kits," and taken with the cellulosics—contain vitamins and minerals, to insure keeping level of these nutrients at a safe level. Prices round off at $3.00 per package, and last, depending on the reducing plan used, for 1-3 weeks.

Promotion is heavy, aimed at captivating the public with the novelty angle of MC and CMC. And people are far more weight-conscious in good times such as these—with depression, the public seems to lose interest.

With a wide variety of uses (CMC is employed in everything from ice-cream thickeners to textile sizes and drilling muds) cellulosics have proved lucrative post war chemicals. But probably few envisioned such fat profits in slimming.

•

Zurd Word: The Murd Co. has been ordered to halt advertising its warfarin-containing rodenticide Zurd as being 100% efficient, saying the USDA has found warfarin will kill all rats and mice and that warfarin is not harmful to dogs and cats.

•

Tough Coat: Pozcote, a corrosion-resistant synthetic coating for wood, masonry, and metal surfaces has been introduced by the Monroe Co., Inc. (Cleveland). A synthetic-resin based finish, it is claimed to be impervious to water, acid, alkalis, alcohols.

•

L. A. Loader: An aerosol loading plant and laboratory has been set up in Los Angeles by Par Industries. Capacity: 8 million cans of aerosol dispensed products.

•

Beauty Venture: Just opened in Los Angeles: New $2 million, 70,000 sq. ft. manufacturing plant of Merle Norman Cosmetics, Inc.

•

Dedusting Duck: A special vinyl-treated duck "carpet," claimed to be flame resistant, fuel- and chemical-proof is being made by Textileather Corp. (Toledo, O.). The duck is placed beneath steel landing mats at temporary airfields; it is designed to cut down the dust at fields, which is particularly damaging to jet aircraft engines. The Marine Corps has contracted for $200,000 worth.

•

Boiler Saver: A preservative and rust preventative for boiler tubing tagged Swirl-Off is being sold by Brilco Laboratories (Brooklyn). A treatment for the fireside of boiler tubes, it is a low viscosity polar liquid said to lower

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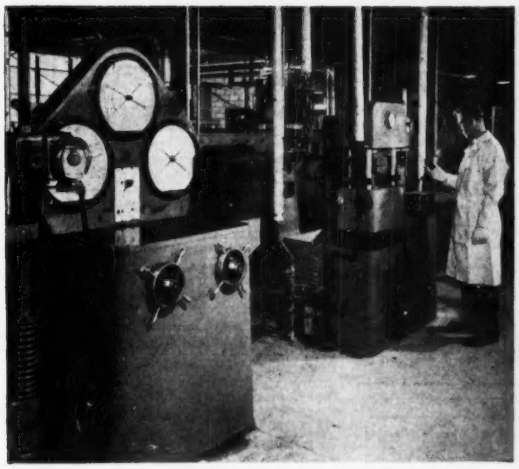

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Consultant wanted with practical commercial experience in producing Dehydrocholic and Cholic Acid from bile. Write giving yields obtainable and service fee requested. P-5469, Chemical Week.

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Position Wanted

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Selling Opportunity Wanted

Sales Administration—Dependable, rapid assistant. Sales; nat'l distrib. consumer & ind'l chems., promotion, adver. campaigns, supervise salesmen. Administration: run office, corres., orders, records; bulletins; quota contests; market research; costs; mgmt. reports. Technical: basic chemistry, solvents, cleaners, inhibitors, oils, etc. Desire tough job, future, responsibility, many functions. BBA, 34, married, $6,000. Personable, like to work. RA-4388, Chemical Week.

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Calender, New 6x12", Johnson Joints, Complete Eagle Industries, 108 Washington St., NYC.

Centrifugal 36"x40", Bird, Continuous, Consolidated Products, 18 Park Row, N.Y. 38, N.Y.

Centrifugals, Bird 48"; Rub. Covered. First Machinery, 157 Hudson St., N.Y. 13, N.Y.

Dryer, Vacuum Shelf, 20 shelves, 59 x 78, pump, cond. (6). Consolid'd. Prod., 18 Pk. Row, N.Y. 38

Dryers, 2 Bfvk 32x90 dble. drum, SS accessories, comp. Eagle Industries, 108 Washington St., NYC.

Dryers, 2 Stainless Drums; 5'x10', First Machinery Corp., 157 Hudson St., N. Y. 13, N. Y.

Filter, horizontal plate, Sparkler, steel, model 18-S-12 with scavenger plate on portable base; Ph. N.Y. DI 9-0838. FS-5453, Chemical Week.

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Filter Press, 30"x30", Iron, Sperry, steam heated, 30 chambers. Consolidated Products, 18 Park Row, N.Y. 38, N.Y. Barclay 7-0600.

Filter Press, 30" x 30", Aluminum, 46 Chambers, Consolidated Products, 18 Park Row, N.Y. 38

Filter Press, 42" x 42", Iron, Shriver, 18, 27, 36, 54 chambers (12). Consolidated Products, 18 Park Row, N.Y. 38.

Filters, all sizes and types. Perry Equipment, 1415 N. 6th St., Phila. 22, Pa.

Kettles, 40, 60, 80 & 100 gal., SS, Iron Clad, Steam Jacketed. Ace Equipment Co., 307 Canal St., N.Y. 13, N.P.

Kettle, S/S, 300 gal. 100# W.P. Consolidated Products, 18 Park Row, N.Y. 38.

Labeler, World Model CH, press type, very good cond. Process Industries, 305 Powell St., Brooklyn 12, N.Y.

Mill New 6x12; Johnson Joints, Complete. Eagle Industries, 108 Washington St., NYC.

Mills, Raymond #5047, High Side Roller, (2). Consolidated Prods., 18 Park Row, N.Y. 38.

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406 Toes In

Last week, at the Hancock, Md., orchards of the University of Maryland, Eastern applegrowers saw how they might match Pacific Coast apples in finish and color. The Esso lab-developed, California Spray Chemical and Stauffer-marketed 406 fungicides appear to do the trick.

Produced in limited amounts since 1949, and fairly plentiful this season, 406 will likely slip into commercial production by next year. For not only is there a juicy market among Eastern fruit growers, but an even larger one as a row-crop seed protectant, plus other applications on the way.

The market's juicy for the Eastern apple grower, because 406 has shown ability to halt apple scab, the finish-damaging fungus that has plagued the East. Previously used fungicides—sulfur, the mercurials, lime-sulfur mixtures—have serious shortcomings: sulfur, a scab preventive, is sometimes phytotoxic (plant damaging), as is the lime-sulfur fungus killer. And mercurials have also caused some damage, in addition to possessing 406's handicap of a somewhat high relative cost.

Fungicide 406 is far from restricted to apple treatments, however. In addition to value on most fruits as a fungicide, it is also finding favor as a preplanting seed treatment. One such commercially sold product is Cal-Spray's Orthocide 75, a protectant applicable to a long list of plants. In some treatments, the 406 is combined with lindane.

Twin Sellers: Wettable spray powders of 406 are now on the market; Cal-Spray's is Orthocide 406; Stauffer has its Stauffer 406. Both sell at about 80¢/lb. The application rate is two lbs./100 gals. of water, so that the cost runs considerably above sulfur, which in ready-to-spray form runs about 40¢/100 gals. Nevertheless, to many growers, the high cost is counteracted by the efficacy and low toxicity toward warm-blooded animals.

And admitting the cost seems high, it's rather low when the problems plaguing production are considered, Cal-Spray points out. The 406 fungicide in N-trichloromethylthio tetrahydrophthalimide. And getting into volume production* of this with farmer-demanded speed has been a rough job. Achieving a reasonably priced, pure compound has been slow work; present production of the compound is at the pilot plant of Cal-Spray in Richmond, Cal. Formulation is done in other Cal-Spray and Stauffer plants.

Now that the growing pains are about over, Cal-Spray and Stauffer will likely move production to a Calhio plant in Perry, Ohio; DPA certified at $800,000, it should be in production by late 1953.

SR 406, as it was originally known, is the development of A. E. Kittleson, of Standard Oil Development Corporation. Worked out in the late '40's, and tested at Rutgers University and the USDA farms, it was licensed to Cal-Spray in 1950. Standard retains export rights, and currently sells Cal-Spray produced material abroad. Stauffer is licensed by Cal-Spray.

Navy Puts up Preserves

CONTINUING its conservation program, the Navy is putting large amounts of valuable-but-excess material into storage. At the Oakland, Cal. Navy Supply center, Robert Strachen checks large cans of gear, which have been marked with content, quantity, date and packing method; the battery of infra-red lamps steps up the stencil driving time. Already over $32 million worth of supplies have been preserved by the station.

* Essentially, 406 is made by combining perchloromethyl mercaptan with tetrahydrophthalimide. The THPI source is maleic anhydride and butadiene—this reaction product condensed with ammonia.

BOOKLETS . . . . . .

Chemicals

General Chemicals

16-p. booklet entitled "Harshaw Chemicals for Industry and Laboratory" contains information on preformed catalysts, catalytic chemicals, electroplating salts, anodes and processes, fluorides, pigments, ceramic opacifiers, and other products. The Harshaw Chemical Co., 1945 East 97th St., Cleveland 6, O.

Vinylite Resins

16-p. technical release gives additional data for paint and industrial coatings manufacturers on the compatability of Vinylite resin VAGH with other film-forming material. Basic properties and uses are included in this revised pamphlet. Bakelite Co., a division of Union Carbide and Carbon Corp., 300 Madison Ave., New York, N.Y.

Plastic Dye

2-p. data sheet describes how Rez-N-Dye cold-dip dye is used to impart color to metallized plastics. Advantages and uses are included. Schwartz Chemical Co., Inc., 326 West 70th Street, New York 23, N.Y.

Biochemicals

8-p. folder gives wholesale price list for fine chemicals, including new products such as hexamethonium, hyaluronidase, isoniazid, methylparfynol, and others. New price list on biochemicals includes amino acids, peptides, enzymes, hormones, and rare sugars. Mann Fine Chemicals, Inc., 136 Liberty St., New York 6, N.Y.

Equipment

Selling Handbook

Five individual inserts are included in booklet entitled "What Happens When the Rain Barrel is Empty?". Evaluating the chemical process market, planning market strategy, setting up for sales, locating the men who buy, and cultivating the buyers' influence are topics covered. Request "The Chemical Process Industries Handbook of Selling," Chemical Week, Dept. PR, 330 West 42nd St., New York 17, N.Y.

Safety Equipment

144-p. catalog entitled "Everything for Safety" describes face shields, welding helmets, liquid and cream protection, safety clothing, machine guards, and many other safety devices. Request on company letterhead, The Boyer-Campbell Co., 6540 St. Antoine St., Detroit 2, Mich.

Pressure-Seal Valves

16-p. catalog includes complete descriptions, design characteristics, and dimensional details on stop, check, and non-return valves. Each type is furnished in sizes from 2½ to 14 inches, and in 600, 900, 1500, and 2500 pound pressure classes. Tables and charts enable calculation of the pressure drop in any stop, check, or non-return valve and complete material specifications are given. Dept. N R, Edward Valves Inc., 1200 West 145th St., East Chicago, Ind.

Speed Reducers

20-p. bulletin offers complete engineering information and selection data on the line of Dodge torque-arm speed reducers and overload release, designed for use with the reducer. Illustrations and cross-section views are included. Request Engineering Bulletin A-614-A, Dodge Manufacturing Corp., Power Transmission Machinery, Mishawaka, Ind.

CHEMICAL WEEK • ADVERTISER'S INDEX • SEPTEMBER 27, 1952

AIRES ASSOCIATES, R. S. 3
Agency—Sterling Advertising Agency
ALLIED CHEMICAL & DYE CORP. 85
Agency—Anderson & Cairns, Inc.
ALOX CORP. 49
Agency—Melvin F. Hall Advertising Agency, Inc.
AMERICAN CYANAMID CO. 62-63
Agency—Hazard Advertising Co.
AMERICAN RESINOUS CHEMICALS CORP. 1
Agency—Bennett, Walther & Menadier, Inc.
ARNOLD HOFFMAN T78
Agency—George T. Metcalf Co.
BAKER & ADAMSON PRODUCTS, GENERAL CHEMICAL DIVISION, ALLIED CHEMICAL & DYE CORP., 3rd cover
Agency—Atherton & Currier, Inc.
BAKER CASTOR OIL CO., THE 61
Agency—Samuel Croot Co., Inc.
BAKER CHEMICAL CO., J. T. 69
Agency—Wildrick & Miller, Inc.
BEMIS BROS., BAG CO. 20
Agency—Garden Advertising Co.
CARBIDE & CARBON CHEMICALS CO., A DIVISION OF UNION CARBIDE & CARBON CORP. 25
Agency—J. M. Mathes, Inc.
CELANESE CORP., OF AMERICA 8
Agency—Ellington & Co., Inc.
CHEMICAL CONSTRUCTION CORP. 28
Agency—Michel-Cather Inc.
CHEMICAL SOLVENTS, INC. C. P. T52
CIBA CO., INC. 42
Agency—Briggs & Varley, Inc.
COMMERCIAL SOLVENTS CORP. 19
Agency—Fuller & Smith & Ross, Inc.
CORN PRODUCTS REFINING CO. 80
Agency—J. Hayden Twiss Advertising
COWLES CHEMICAL CO. 84
Agency—The Bayless-Kerr Co.
DEMPSTER BROS., INC. 79
Agency—Charles S. Kane
DRACCO CORP. 12
Agency—The Jayme Organization, Inc.
DREW & CO., INC., E. F. 40
Agency—The Aitkin Kynett Co.
EMPIRE TRUST CO. T56
FARVAL CORP., THE 17
Agency—The Griswold Eshleman Co.
FULTON BAG & COTTON MILLS 51
Agency—Herbert Rogers Co.
GAYNAR GLASS WORKS 57
Agency—Sommers-Davis Inc.
GENERAL AMERICAN TRANSPORTATION CORP. 46
Agency—Weiss & Geller, Inc.
GIROLER CORP., THE 71
Agency—The Griswold-Eshleman Co.
GLYCERINE PRODUCERS ASSOC. 44
Agency—G. M. Basford Co.
GRAVER TANK & MFG. CO., INC. 75
Agency—Simmonds-Simmonds, Inc.
HALL CO., THE C. P. 55
Agency—Cruttenden & Eger Advertising
INTERNATIONAL MINERALS & CHEMICAL CORP. 54
Agency—C. Franklin Brown, Inc.
IOWA DEVELOPMENT COMMISSION 2
Agency—Ambro Advertising Agency
JASONOLS CHEMICAL CORP. T83
JEFFERSON CHEMICAL CO., INC. 21
Agency—Hazard Advertising Co.
JOHNS MANVILLE CORP. 76
Agency—J. Walter Thompson Co.
JOY MANUFACTURING CO. 23
Agency—Walker Downing General Agency
KENNEDY CAR LINER & BAG CO., INC. 58
Agency—Grubb & Peterson
KOPPERS CO., INC. B50
Agency—Batten, Barton, Durstine & Osborn, Inc.
LITHIUM CORPORATION OF AMERICA, INC. T68
Agency—F. H. Faber, Advertising
MATHIESON CHEMICAL CORP. ..... 2nd cover
Agency—Doyle, Kitchen & McCormick, Inc.
MC GRAW-HILL BOOK CO. R70
MC LAUGHLIN GORMLEY KING CO. B52
Agency—The Alfred Colle Co.
NEWARK WIRE CLOTH CO. 4
Agency—Sanger-Funnell, Inc.
NORTON CO. 11
Agency—James Thomas Chirurg Co.
OLDBURY ELECTROCHEMICAL CO. T50
Agency—Briggs & Varley, Inc.
PACIFIC COAST BORAX CO. 18
Agency—Howard M. Irwin & Assoc.
PENN. INDUSTRIAL CHEMICAL CORP. .. 39
Agency—Walker & Downing Advertising
PETROLITE CORP., LTD., WAX DIVISION 65
PITTSBURGH COKE & CHEMICAL CO., FINE CHEMICALS DIVISION 37
Agency—Walker Downing General Agency
POWELL CO., THE WM. 72
Agency—Associated Advertising Agency, Inc.
PRESSED STEEL TANK CO. 67
Agency—The Buchen Co., Inc.
RAYMOND BAG CO. 60
Agency—H. T. Shephard Agency
SNELL INC., FOSTER D. B68
Agency—Ray Hawley
SPENCER CHEMICAL CO. 59
Agency—Bruce-Brewer & Co.
SUNDHEIMER CO., HENRY B78
Agency—Givaudan Advertising, Inc.
TAYLOR-WHARTON IRON & STEEL CO. B56
Agency—A. B. Bicknaver
UNION CARBIDE & CARBON CORP. CARBIDE & CARBON CHEMICALS CO. 25
Agency—J. M. Mathes, Inc.
U.S. STEEL CO. 64
Agency—Batten, Barton, Durstine & Osborn, Inc.
U.S. TESTING CO. 66
Agency—Robert B. Grady Agency
VIRGINIA SMELTING CO. 24
Agency—Gray & Rogers, Advertising
WESTINGHOUSE ELECTRIC CORP. 26-27
Agency—Fuller & Smith & Ross
WILLSON PRODUCTS, INC. L70
Agency—Beaumont Heller & Sperling, Inc.
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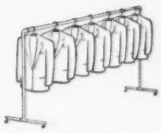

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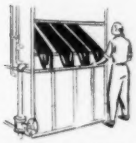

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